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THE

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AN

ILLUSTRATED MAGAZINE

OF

NATURAL HISTORY,

CONDUCTED BY

JOHN E. ROBSON, F.E.S., Hartlepool,

WITH THE ASSISTANCE IN VARIOUS DEPARTMENTS OF

G. C. BIGNELL, F.E.S., PLYMOUTH ;
C. A. BRIGGS, F.E.S., LONDON ;
S. J. CAPPER, F.L.S. F.E.S, LIVERPOOL
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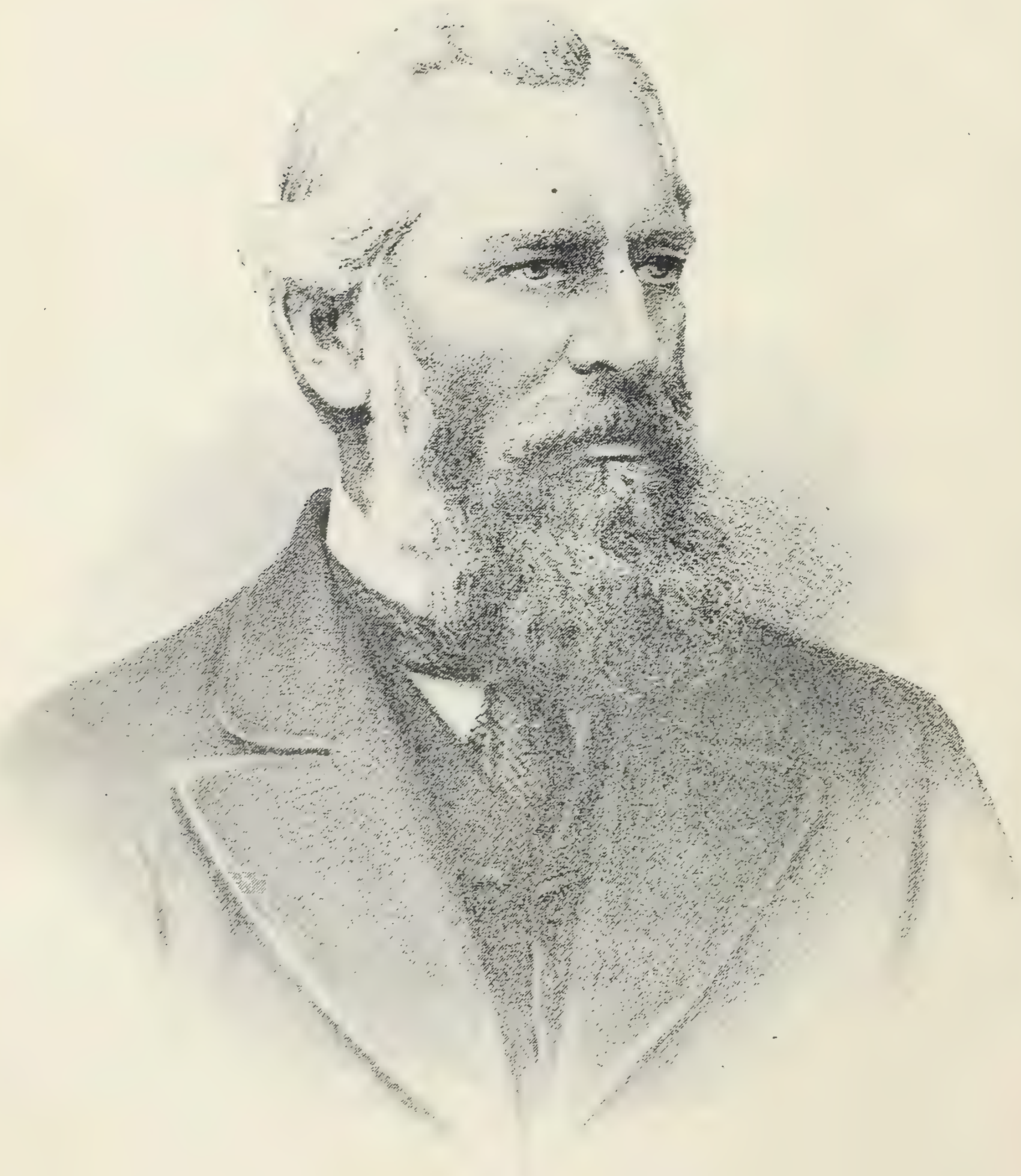

WILLIAM HENRY FLOWER, K.C.B.,

F.R.C.S., LL.D., F.R.S., F.Z.S., F.L.S.

THE

BRITISH NATURALIST.

VOL. III.

NATURALISTS OF THE DAY.

XII.—WILLIAM HENRY FLOWER, K.C.B.,
F.R.C.S., LL.D., F.R.S., F.Z.S., F.L.S.

We have much pleasure, on the commencement of a new volume, in presenting to our readers a portrait of the distinguished naturalist who presides over the Natural History Museum at South Kensington.

Professor Flower was born at the classic town of Stratford-on-Avon, in November, 1831, and was educated privately, afterwards proceeding to University College, London. Developing an early inclination towards Natural History he especially devoted himself to the collecting and dissection of animals, and, in 1849, matriculated with honours in Zoology, at the University of London. In the same year he entered the medical classes at University College, and became a pupil at Middlesex Hospital. At the former institution he gained the gold medal in Dr. Sharpey's class of Physiology, with the silver medal in Zoology, and passed the first M.B. at the London University, in 1851. He became a member of the Royal College of Surgeons in 1854, and soon afterwards joined the Medical Department of the Army. In a short time he was gazetted as Assistant-Surgeon to the 63rd Regiment, and embarked for Constantinople. The suffering of both men and officers in the Crimean campaign, owing to the severity of the climate, are too well known to need comment, and it is little cause for wonderment that Mr. Flower's health soon gave way, and he was invalided home to England. In recognition of his services in the Crimea he received from the Queen's hands the war medal with clasps for Alma, Inkerman, Balaclava, and Sebastopol.

He now resigned his position in the Army, and joined the staff of Middlesex Hospital as demonstrator of Anatomy. In 1857, he passed the examination for Fellowship of the Royal College of Surgeons, and in 1858 was elected Assistant Surgeon to Middlesex Hospital, where he became Curator of the Museum and Lecturer of Comparative Anatomy. Whilst thus occupied he published a work on "Diagrams of the Nerves of the Human Body," and contributed an article to Holmes' "System of Surgery," besides other contributions to various medical journals.

In 1858 he married the youngest daughter of Admiral W. H. Smith, the astronomer and hydrographer.

In 1861 he was appointed to the important office of Conservator of the Museum of the Royal College of Surgeons (the Hunterian Museum), and from this period devoted himself to scientific pursuits. In 1869 on the the retirement of Professor Huxley, Mr. Flower accepted the Hunterian Professorship of Comparative Anatomy and Physiology; his principal literary contributions during the tenure of this office being lectures on "The Osteology of the Mammalia," and on "The Comparative Anatomy of Man," besides various papers on Osteological subjects.

Professor Flower was elected a Fellow of the Royal Society in 1864, has served several times on the Council, and was Vice-President in 1884-5. He became President of the Zoological Society in 1879, having been many years previously a member of the Council and one of the Vice-Presidents.

It would occupy too much space to follow in detail the various offices held by Professor Flower in scientific and learned societies, and we therefore pass on to his appointment on the resignation of Sir Richard Owen, as Director of the Natural History Museum at South Kensington.

No one can deny that the knowledge and experience gained by Prof. Flower as Conservator of the Hunterian Museum, had eminently fitted him to fill this important office, and it may safely be said that the South Kensington Museum, as it it now exists, owes a great deal to the administrative qualities and discriminating judgment of its present director, aided of course by the staff of specialists under his command. In the great hall we have the statue of Darwin, to which is attached a curious little history. It would appear that the only guide afforded to the sculptor was a photograph taken at Darwin's home. The said photograph is now in the possession of Professor Flower, who kindly produced it at a recent visit, for our inspection. The representations of bird life in natural surroundings, besides other features of Zoology and Botany, are highly instructive to students of all ages. It may briefly be said that many of the departments of Natural History study in the museum cannot be surpassed. There is one thing which we might perhaps point out as likely to be beneficial to the masses who visit the museum during holiday times, and that is the appointment of someone to give information respecting the insects, etc., contained in the various show cases. We remember once going to South Kensington on a wet Bank Holiday, and making a special visit to the typical collection of British Coleoptera. Some dozens of visitors were casually passing, and one or two inquiries were made concerning the beetles which occupied our attention. In a short time some fifty or sixty persons were gathered round, listening attentively to our remarks on the life history of the specimens before us. On our withdrawal, however, the crowd soon dispersed.

A slight reference may here be made to Professor Flower's literary work. Besides the contributions before alluded to, he has published many papers in the journals of various societies, a supplement to the "Catalogue of the Pathological Series in the Museum of the College of Surgeons," rendered necessary by the extensive additions made to the Museum; also a "Catalogue of the Specimens illustrating the Osteology and Dentition of Vertebrated Animals, recent and extinct." Both catalogues are indispensable to students engaged in the investigation of physical anthropology, He has likewise written on "Mammalia," and other Zoological subjects, for the new edition of the "Encyclopædia Britannica." In addition to these, he has recently published a work on "The Horse," and in conjunction with Mr. R. Lydekker, a volume entitled "An Introduction to the Study of Mammals, Living and Extinct." These works being of the highest importance to scientists, bear ample testimony to the patient research, investigation, and careful study, bestowed on their compilation, and are worthy of the just tribute of praise accorded to them.

In closing our account of his labours, it affords us much gratification to state that Professor Flower was created K.C.B. in August last, the announcement being made to him by letter direct from Lord Salisbury. It is almost needless to say that congratulations from all parts of the world, including a letter from Marlborough House, were received by him on this occasion.

THE MOLLUSCA OF NOTTINGHAMSHIRE.

BY W. A. GAIN.

The county of Nottingham has been well worked conchologically, the result being that a large number of species have been recorded, some from numerous localities.

In 1853, Mr. Lowe published his "Conchology of Nottingham," and in 1881 Messrs. B. S. Dodd and C. T. Musson, published in the

Nottingham Naturalists' Society's Report, their paper on "Local Land and Fresh-water Shells." On his departure for the Antipodes, my friend, Mr. C. T. Musson, presented me with the volumes containing his collecting notes, embodying the results of many years diligent searching in all parts of the county ; from these and the publications previously mentioned I shall draw largely in the following compilation.

AQUATIC.

Class *Conchifera*. Order *Lamellibranchiata*.

GENUS SPHÆRIUM, Scop. (= CYCLAS, Brugiére).

Sphærium corneum, L.—This species is very widely diffused in rivers, lakes, ponds, canals, and ditches, often found in large numbers.

Var. *flavescens*, McGill.—Near Beeston, Lowe.

Var. *nucleus*, Stud.—Mentioned on the authority of Mr. Lowe as occuring in Musco Sic Brook.

Var. *pisidoides*, Gray.—Canal at Beeston, Lowe.

Var. *scaldiana*, Norm.—Lake at Clumber. I found very large numbers of this variety in the filters, many of the shells were deformed, evidently from the pressure of the closely packed mass.

Sphærium rivicola, Leach.—This species abounds in the river Trent, and in the canals.

Sphærium pallidum, Gray, (= *S. ovale*, Jeff).—Has been recorded from Beeston by Mr. Lowe. Mr. Musson adds a note "Trent, at Beeston."

Sphærium lacustre, Müll.—Generally distributed and plentiful, in ponds, etc.

Var. *Brochoniana*, Bourg.—Attenboro' and the backwater at Beeston, Mr. Lowe. Mr. Musson and myself found it in the lake in Clumber Park, a locality mentioned by Rimmer ("Land and Fresh-water Shells") some years ago, but the examples were poor. On a more recent visit, I failed to get any but dead shells. The fines examples I have seen of this variety were taken at Marham, by a friend, from a portion of the river Trent, which is protected from the current by a narrow strip of land forming a peninsula ; this piece of water has also yielded large numbers of shells of other species, and of fresh-water sponges.

GENUS PISIDIUM, Pfr.

Pisidium amnicum, Müll.—Common in canals and rivers.

Pisidium fontinale, Drap—Common and widely distributed throughout the county.

Var. *Henslowiana*, Shepp.—Found in many localities in small numbers.

Var. *pulchella*, Jenyns.—Musco Sic dyke, Beeston, and Stanton-on the-Wold, Lowe. Common in the lake at Thorsby, Musson.

Var. *cinerea*, Alder.—Beeston and Lenton, Lowe. The lake at Thorsby, Musson. Clumber lake, Jeffrey, where Mr. Musson also found it plentiful.

Var. *pallida*, Gassies.—Mentioned by Dodd and Musson in their catalogue without locality.

Pisidium pusillum, Gemlin.—Common in rivers, canals, and ponds and in the ditches in the Nottingham meadows.

Var. *obtusalis*, Lam.—Beeston, Lowe. Beeston and Attenboro', Musson.

THE PTEROPHORINA OF BRITAIN.

BY J. W. TUTT, F.E.S.

(Continued from Vol. II., p. 254).

Referring to the best time to search for larvæ, Mr Smith writes :—"When fleabane (*Inula dysenterica*) is making its appearance, the unfolding and proper development of some of the shoots, especially terminal ones, appear impeded; examination will in all probability show the check to be due to the presence of young *Œ. lithodactylus* larvæ. This is the best time to secure them, as they are almost certain to be free from parasites. Later the larvæ may be found on the upper sides of the expanded leaves, if looked for just after dark. Patches of the fleshy part of the leaf are eaten away, exposing the skeleton and rendering the plants infested very conspicuous objects. This species is said to feed also upon *Conyza squarrosa* in a like manner ("Entomologist," Vol. XV., p. 104). Mr. Gregson writes of the habits of this species :—"This is another species which is useful to man, living as it does, on a noxious weed which so abounds in some limestone sheep fells in North Lancashire and Westmoreland, that anything that has a tendency to check or destroy it must be esteemed useful; for although the husbandman may work ever so hard in extirpating the low growing plants, he is powerless on the rock faces and narrow ledges from whence the seeds are regularly scattered; but here we have one of Nature's agents, an insect which so consumes the leaves that the plant dies, and useful herbage springs up, where once a wide-spreading and useless plant encumbered the ground. I may remark incidentally, that I have selected instances of useful insects from those whose life history is either unknown or imperfectly known. I do not know a single species of the genus *Pterophorus* that feeds upon a useful plant, although, in England, *Pterophorus rhododactylus* feeds on, but does not destroy, the most ornamental garden plant, the rose" ("Entomologist," III., p. 201).

PUPA—The pupa which looks very much like the larva was first described by Mr. Gregson, who writes:—"The pupa is hairy, the head and wing-cases green, the abdomen lighter green with a pinkish tinge, suspended by the tail; the pupa state lasts about fifteen days, when the perfect insect appears" ("Entomologist," Vol. III., p. 201). Mr. Porritt further writes:—"The pupa is so similar in appearance to the larva, that it had actually been in that stage several days before I found out the fact. I noticed, as I fancied, the larva on the upper side of a leaf, motionless, and as I supposed, changing its skin, and was not a little surprised, on examining it closely, to discover it had become a pupa. The markings, and almost the shape, had assumed the same character as the larva, but the broad purple dorsal stripe was gone, and replaced by a series of pale green lozenge-shaped marks, connected at the abdominal divisions; the sub-dorsal region dull purple; wing-cases pale green, with several purplish streaks; under side af abdomen pale green, like the larva also, thickly clothed on the dorsal surface with short, whitish hairs. The imago appeared on the 12th of July" ("Entomologist's Monthly Magazine," p. 236). The pupa was again described by Mr. South "Entomologist," XV., p. 104). It varies considerably in colour, and hence descriptions made from individual specimens are of but little actual value.

HABITAT—This species appears to occur whereever its food plants are to be found. I have taken it on exposed sandhills, in sheltered woods, in marshes, and by the side of ditches and hedges. It is, however, peculiar in its habits, and I do not remember ever having disturbed a specimen in the daytime, although I have been in localities where I knew it abounded, and where it has been common enough in the evening. After dusk, and as soon as it begins to get dark, *lithodactyla* comes up from the herbage and may then be taken abundantly in its favoured haunts, flying among its foodplant. It is widely distributed, and generally fairly abundant where it occurs. Stainton gives:—"Bristol, Darlington, Lewes, Manchester, Scarborough, York and Lulworth Cove. I have taken it in the Isle of Wight, and it occurs in most of the localities in which I have worked (I have not noticed it in Wicken Fen though). It is recorded as being taken freely at St. Anne's-on-Sea, in the "Entomologist's Record," Vol. I., p. 155. Mr. Kane records it from Galway; Mrs. Hutchinson, from Leominster, "some years frequent"; Mr. A. W. P. Cambridge writes:—"Rare at Bloxworth; in woods among *Inula dysenterica*, etc., *(in litt.)*"; and Mr. Porritt gives me "Doncaster and Llandudno" as localities. Mr. Hodgkinson reports the larvæ as common on leaves of *Conyza squarrosa*, at Grange-over-Sands; and Wocke gives "Central Europe, Russia (North, South, East and West), Piedmont" ("Catalog," p. 344).

Time of Appearance—The species is single-hooded and occurs in July and Angust, rarely before the second week of the former month. Its date of emergence varies in different years, and depends largely on the meteorological condition of each particular season. Stainton gives "end of July and August."

Pterophorus, Wallengren, Geoffroy.

This, the typical genus of the group, contains only one species which is widely distributed throughout the Northern hemisphere, in America, Europe, and extending into Armenia. When at rest its name *mono dactylus* becomes very suggestive, as its wings are rolled up on each side so as to form as it were "one" finger or wing pointing in opposite directions.

This genus is thus characterised by Wallengren:—"Antennæ rather long, those of the male finely serrated, of the female very indistinctly ciliated, with the basal joint thickened. Forehead obtuse, the feathers forming no cone. Palpi shorter than the head, slender, rounded, somewhat ascending, pointed, with the joints not distinguishable. The tibiæ all slender, not thickened. First pair of spines in the posterior tibiæ very unequal, the inner spine very long, being more than double the length of the exterior one. Anterior wings cleft to one-third of their length, the posterior angle in the anterior segment wanting, in the posterior segment not very distinct. The segments of the posterior wings slender, the posterior segments without black scales in its very long fringes. The anterior margin of the anterior wings deflexed, the posterior margin not toothed, with the whole posterior segment both deflexed and turned in so as to form a channel, in which the posterior wings are received when the insect is at rest. Veins of the anterior wings, nine, of uniform thickness; the first from the base, almost in the very margin; the second joined at the base with the common lower trunk of the veins; the third from the posterior margin of the cell, and as well as the fourth, which is two-branched, arises from the posterior angle of the cell, running into the inferior segment; the fifth to the seventh are simple, and arise almost from the same place (the anterior angle of the cell), running into the anterior segment; the eighth arises from the anterior margin of the cell, and the ninth from the base. The veins of the posterior wings are five; the first, two-branched, arising from the anterior angle of the cell, and running into the first segment; the second and third both simple, the second arising from the posterior angle, and the third from the posterior margin of the cell, and ending in the second segment; the fourth and fifth simple, springing from the base, and ending in the third segment. The cell of the anterior wings almost open, the transverse veinlet very slender, not distinguishable. The cell of the posterior wings closed by a spurious transverse veinlet" ("Entomologist's Monthly Magazine," Vol. VI., p. 149).

LIST OF LEPIDOPTERA OF ABERDEENSHIRE AND KINCARDINESHIRE

BY WM. REID, PITCAPLE.

(Continued Vol. II. from p. 145).

TORTRICES.

Halias prasinana.—A common species in oak woods, larvæ abundant below the trees after a gale.

Sarothripa revayana.—Widely distributed, but nowhere common. I have captured several near Pitcaple within the last few years.

Tortrix rosana.—Abundant everywhere, and variable. Mr. Horne has bred some beautiful forms from larvæ found in Aberdeen.

Tortrix ribeana. - A very scarce species, Mr. Tait has it in his collection from the Inverurie district.

Tortrix corylana.—Rather common in several lowland localities.

Tortrix unifasciana.—Not rare at Aberdeen (Horne), I have taken it singly near Kintore, Inverurie, on Ben-na-chie and near Braemar (Reid).

Tortrix viburnana.—Abundant on the moors and mountain near Braemar, also common on all our heaths.

Tortrix icterana. – Very local, common in a few localities, scarce near Pitcaple.

Tortrix viridana.—Scarce, recorded from Ballater, and Kildrummie by Prof. Trail, Mr. Horne has found it near Murtle, and it has also been taken near Inverurie.

Tortrix ministrana.—Exceedingly local, common where it occurs. I have occasionally seen the dark unicolorous form.

Tortrix fosterana.—Very rare, Aberdeen, Inverurie, Chapel, and Pitcaple.

Tortrix branderiana.—Mr. Horne has one which he captured at Colieston on the Buchan coast (it was named by Mr. Barrett).

Amplusa prodromana.—Not uncommon on the moors flying in the morning sunshine.

Peronea sponsana.—Common everywhere, a rather common insect, at sugar in the Autumn. The light form is rare, I have never taken it yet.

Peronea lipsiana.—Rare, near Braemar, and occasionally on Ben-na-chie. The larva feeds on *Vaccinium Myrtillus.*

Peronea mixtana.—Abundant on all moors, especially in spring.

Peronea comariana.—Very rare, has been discovered near Inverurie.

Peronea comparana. – Widely distributed, sometimes common.

Peronea caledoniana.—Common on nearly all our moors.

Peronea variegana.—Rather local, abundant where it occurs and exceedingly variable.

Peronea hastiana. - Abundant in many places, the larvæ and pupæ are sometimes common on sallows, on the moors, and sand hills. The most variable member of the genus occurring with us.

Peronea maccana.—Dr. White has found it near Braemar, the larva feeding on wortleberry.

Peronea ferrugana.—Common in many places, always local.

Peronea aspersana.—Rather local, but abundant and variable.

Teras caudana.—Widely distributed and common, does not vary so much as further South.

Teras contaminana.—Swarms round hawthorn hedges in many places.

Dictyopteryx lœflingiana—Rather common.

Dictyopteryx bergmanniana.—Common, larvæ abundant on rose.

Argyrotoxa conwayana. —Scarce near Inverurie (Reid). Not scarce in Murtle Den (Horne).

Penthina sororculana (Prælongana).—Widely distributed, and very scarce (Reid). Not rare at Derncleugh (Horne).

Penthina pruniana.—Not uncommon.

Penthina dimidiana,—Imagines rather scarce, flying at dusk, larvæ abundant on Ben-na-chie, also common in many other places.

Penthina sauciana.—Very rare near Braemar.

Spilonota neglectana.—Not rare near Pitcaple and Inverurie.

Pardia tripunctana. – Common almost everywhere.

Sericoris littorana. —Rocks at Bay of Nigg (Professor Trail). Common at Bay of Nigg and Muchalls (Mr. Horne).

Sericoris cespitana.—Widely distributed and not rare (Reid) Abundant and variable at Muchalls (Horne.)

Sericoris lacunana.—Common almost everywhere.

Sericoris urticana.—Very scarce.

Sericoris micana.—Links at Aberdeen (Z 2401).

Sericoris irriguana.—Abundant on Creag-na-Dàla-Bige (Dr. White). I have found it in abundance on the same mountain, also on Meall Glasail Beag and Carn Liath, near Braemar, and on Carn Aosda, Carn Chrionaidle, and Caon-an-Tuire. I have no doubt it occurs on all the higher mountains south of Braemar, it is abundant on nearly all the Perthshire and Forfarshire mountains between Braemar and Glen Shee. Flies in the sunshine, and and is always abundant where it occurs. I never saw it much below 2000 feet.

Mixodia schulziana.—Common on all our moors and mountains.

Mixodia palustrana.—Widely distributed but not common.

Mixodia rubiginosana (Bouchardana).—Very scarce, among Scotch fir trees, near Inverurie.

Euchromia arbutana.—Scarce near Braemar.

Orthotænia antiguana.—Recorded by Professor Trail as occuring at Muchalls.

Cnephasia politana.—Common on all our hills and moors.

Cnephasia musculana.—Abundant everywhere.

Sciaphila perterana.—Scarce (Professor Trial).

Sciaphila virgaureana—Scarce, near Inverurie and Aberdeen.

Sciaphila octomaculana.—Rather local, but not rare.

Sciaphila penziana (Colquhouana).—Not uncommon on the rocks along the Kincardine coast.

Spaleroptera ictericana.—This species has been turned up near Inverurie, it is very rare.

Clepsis rusticana.—I have taken several lately in wet places on the moor.

Bactra lanceolana.—Common almost everywhere, not found on the higher mountains.

Phoxopteryx siculana.—Widely distributed and not uncommon, very dark and beautifully marked.

Reports of Societies.

ENTOMOLOGICAL SOCIETY OF LONDON.

December 7th, 1892.—Frederick DuCane Godman, Esq., F.R.S., President, in the chair. The President announced the death, on the 2nd December, of Mr. Henry T. Stainton, F.R.S., an ex-President of the Society. A vote of condolence with Mrs. Stainton was passed by the meeting. Mr, Frank Bouskell, of 11, Lansdowne Road, Stoneygate, Leicester; Mr. George C. Dennis, of Tower Street, York; Mr. Charles

B. Headley, of Stoneygate Road, Leicester; Mr. William Mansbridge, of Luther Place, Horsforth, near Leeds; and the Rev. George W. Taylor, of St. Barnabas, Victoria, British Columbia, were elected Fellows of the Society. Mr. Jenner Weir exhibited a species of *Acræa*, from Sierra Leone, which Mr. Rowland Trimen, who had examined the specimen, considered to be a remarkable variety of *Telchinia encedon*, Linn. It was a very close mimic of *Limnas alcippus*, the usual Western African form of *Limnas chrysippus*. The upper wings of the specimen were rufous, and the lower white, as in the model, and the resemblance in other respects was heightened by the almost total suppression of the black spots in the disc of the upper wings, characteristic of the usual markings of *T. encedon*. Mr. F. J. Hanbury exhibited a remarkable variety of *Lycæna adonis*, caught in Kent this year, with only one large spot on the under side of each upper wing, and the spots on the lower wings entirely replaced by suffused white patches. He also exhibited two specimens of *Noctua xanthographa* of a remarkably pale brownish grey colour, approaching a dirty white, obtained in Essex in 1891; and a variety of *Acronycta rumicis*, also taken in Essex, with a beautiful dark hind margin to the fore wings. Mr. H. J. Elwes exhibited a living specimen of a species of *Conocephalus*, a genus of *Locustidæ*, several species of which, Mr. C. O. Waterhouse and Mr. McLachlan stated, had been found alive in hothouses in this country. Dr. T. A. Chapman exhibited immature specimens of *Tæniocampo gracilis*, *T. gothica*, *T. populeti*, *T. munda*, *T. instabilis*, and *T. leucographa*, which has been taken out of their cocoons in the autumn, with the object of showing the then state of development of the imagos. Mr. F. W. Frohawk exhibited a living specimen of the larva of *Carterocephalus palæmon* (*Hesperia paniscus*), hybernating on a species of grass which he believed to be *Bromus asper*. The Rev. Canon Fowler and Mr. H. Goss expressed their interest at seeing the larva of this local species, the imagos of which they had respectively collected in certain woods in Lincolnshire and Northamptonshire. Mr. Goss stated that the food-plants of the species were supposed to be *Plantago major* and *Cynosurus cristatus*, but that the larva possibly feed on *Bromus asper*. Mr. C. G. Barrett exhibited a long series of remarkable melanic and other varieties of *Boarmia repandata*, bred by Mr. A. E. Hall from larvæ collected near Sheffield, Mr. W. Farren exhibited, and commented on, four varieties of *Papilio machaon* from Wicken Fen; also a series of two or three species of *Nepticulæ* pinned on pith with the "minutien Nadeln," for the purpose of showing these pins. Canon Fowler exhibited specimens of *Xyleborus perforans*, Woll., which had been devastating the sugar-canes in the West Indies Mr. C. O. Waterhouse stated that the larvæ had done great damage to beer-casks in India. Mr. E. B. Poulton showed, by means of the oxy-hydrogen lantern, a number of slides of various larvæ and pupæ, in illustration of his paper, read at the October meeting, entitled, "Further experiments upon the colour-relation between certain lepidopterous larvæ and their surroundings," He stated that he believed that nineteen out of twenty larvæ of *Geometridæ* possessed the power of colour adjustment. Mr. F. Merrifield, the Rev. J. Seymour St. John, and Mr. Jacoby took part in the discussion which ensued. Mr. F. Merrifield read a paper entitled, "The effects of temperature on the colouring of *Pieris napi*, *Vanessa atalanta*, *Chrysophanus phlæas*, and *Ephyra punctata*," and exhibited many specimens thus affected. In the cases of *P. napi*, *C. phlæas*, and *E. punctata*, he remarked that they corresponded with natural variations of these species in regions or seasons associated with similar temperatures; and some curious effects produced by severe temperatures on *V. atalanta* seemed likely to throw light on the evolution of the complex markings of the Vanessas. Mr. Poulton, Dr. F. A. Dixey, Mr. Elwes, Mr. Jenner Weir, Mr. Tutt, and Mr. Frohawk took part in the discussion which ensued. Mr. Kenneth J. Morton communicated a paper entitled, "Notes on *Hydroptilidæ* belonging to the European Fauna, with descriptions of new species." Mr. McLachlan made some remarks on the subject of this paper. Dr. T. Algernon

Chapman read a paper entitled, "On some neglected points in the structure of the pupa of Heterocerous Lepidoptera, and their probable value in classification; with some associated observations on larval prolegs." Mr. Poulton, Mr. Tutt, Mr. Hampson, and Mr. Gahan took part in the discussion which ensued. Mr. J. Cosmo-Melvill communicated a paper entitled, "Description of a new species of Butterfly of the genus *Calinaga*, from Siam." Mr. W. L. Distant communicated a paper entitled, "Descriptions of new genera and species of Neotropical *Rhynchota*."—H. Goss and W. W. Fowler, *Hon. Secretaries*.

CITY OF LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY.

Tuesday, 6th December.—Exhibits.—Mr. Clark, a specimen of *Vanessa cardui*, taken in the New Forest, part of the wings having a bleached appearance. Mr. Bacot, a variable series of *Hybernia defoliaria* from Epping Forest. Mr. Prout, a long series of *Caradrina blanda*, and one specimen of *C. alsines* from Sandown. Mr. Battley, *Cerastis vaccinii* and *C. spadicea* taken this autumn, including specimens of each with a pale band on the hind margin. Mr. Bayne, variable series of *Oporabia dilutata*. Mr. Smith, *Lycæna ægon* from Lyndhurst, also varieties of the undersides of *L. adonis*. Mr. Riches, a fine bred series of *Xylophasia scolopacina* from Highgate Woods; also flowers of the Lady's slipper (*Cypripedium insigne*) and *Chrysanthemum*. Coleoptera:—Mr. Heasler, specimens of *Homalota æquata*, *Epipeda plana*, *Coryphium angusticolle*, *Prognatha quadricorne* and *Phlæcharis subtillisima*. Mr. Rosevear, a living larva of *Melalontha vulgaris*. The following gentlemen were elected as officers for 1893: President and Treasurer, Mr. J. A. Clark; Vice-Presidents, Mr. J. W. Tutt and Dr. Buckell; Curators, Messrs. Smith and Heasler; Librarians, Messrs. Gurney and Nicholson; Council, Messrs. Bayne, Hollis, Lewcock, Newberry and Prout; Secretaries, Messrs. Battley and Simes.

Tuesday, 20th December.—Exhibits.—Mr. Smith, *Thecla betulæ*, *T. quercus*, *Hesperia actæon*, *H. lineola*, *B. quercus*, *B. rubi*, *Lasiocampa quercifolia* and many others, all taken or bred this season. Mr. Riches, *Melanarge galathea*, also a flower of a hairy Japanese *Chrysanthemum*. Coleoptera:—Mr. Lewcock, *Nebria complanata*, taken by Mr. Cuthbert, in Ireland, *Pachyta collaris* and other species from Farnham, *Cryptocephalus fulcratus* and others from West Wickham, and several species from Brockenhurst. The evening was devoted to the exhibition and discussion of *Colias edusa*, of which here was a good show. Besides the var. *Helice*, several members exhibited intermediate forms, also specimens of the lemon coloured variety and preserved larva.

LANCASHIRE AND CHESHIRE ENTOMOLOGICAL SOCIETY.

December 12th.—The president (Mr. S. J. Capper, F.L.S., F.E.S.) in the chair. Mr. J. Lea, Canning-street, was elected a member of the society. The president referred to the death of the veteran entomologist, H. T. Stainton, and remarked that no one had done more to encourage the study of entomlogy. Messrs. G. A. Harker and H. B. Jones gave a paper entitled, "Notes on a fortnight's collecting in Galway," the principal insects taken being *Zygaena minos*, *Miana captiuncula* two specimens of the rare *Triphæna subsequa* and *Rhodaria sanguinalis*, and exhibited specimens of, and and pointed but differences between, English and Irish forms. The *Miana oaptiuncula* being especially interesting being much more strongly marked than the English forms, the female having two entire cream coloured fasciæ. The *Lycaena icarus* very bright females with large and brilliant red spots. The president exhibited large

Irish *Vanessa urticæ*, Mr. Gregson a remarkably fine specimen of *Prodelia testaceoides* Gn bred from a larva taken in a market at Barnsley, and bred by George Rose. Mr. Stott (on behalf of Mr. H, S. Clarke) *Sphinx convolvuli* from the Isle of Man, and some fine varieties of *Smerinthus tiliæ*, Mr. Pierce a specimen of *Ceratocampa regalis.* Mr. J. H. Stott *Sirex gigas* from a North Staffordshire Coal Mine.—J. N. PIERCE, *Hon. Sec*

143, Smithdown Lane, Liverpool, *13th December, 1892.*

No other Reports of Societies have been received.

SWITZERLAND—A NATURALIST'S PARADISE.

BY W. R. SCOWCROFT. *

Early in the month of July, accompanied by my friend Mr. Charles Stott, I left London for Lucerne. As it was our first visit to Switzerland, we naturally wished to see something of the country, and therefore did not devote ourselves entirely to entomology; but the results of our tour are, I think, of sufficient interest to justify me in bringing them before this Society.

The incidents of our journey *via* Harwich to Antwerp, and thence through Brussels and Bâle, I will pass over, as scarcely falling within the scope of this paper.

As we approached our journey's end the scenery became grander and more varied, and we had charming views of lake and mountain, of pine clad slopes, and undulating hill sides dotted here and there with picturesque little chalets.

It was a superb morning, and the vision of the Bernese Oberland in the far distance, with the mystery of the dawn still clinging around it, was lovely and impressive beyond description.

This grand range of mountains, varying in height from 10,000 to 14,000 feet, its peaks covered with perennial snows, was perfectly free from cloud. Distance and the dawn mystery gave these Alps an aerial delicacy and softness of outline. Uplifted in their transcendent purity to the heavens, they seemed like glorified spirits of mountains, and were lovely with a pure spiritual beauty.

We reached Lucerne about 10 o'clock on Sunday morning, and between this and evening saw much of this beautifully-situated, quaint and interesting old town.

Whether crossing over the swift-flowing Reuss by the curious and artistic old bridge, or walking along the fine Schweigerhof Quay; or strolling under the avenue of chestnuts; or lingeringly gazing upon ist clear beautiful lake, the imagination cannot but be vividly impressed with the poetic loveliness of the surroundings of Lucerne.

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* A Paper read before the Lancashire and Cheshire Entomological Society, 14th November, 1892.

Surely nowhere can there be found a richer harmony of beauty and grandeur, of grace and sublimity, of loveliest pastoral and serenest or sternest mountain scenery. Surely here, if anywhere, the lion and the lamb lie down together, peace reclines on the bosom of strength.

On the east stands Rigi, a mountain nearly 6,000 feet high, with a commanding position which is almost unique. Southwards, behold Pilatus, its bold outline standing out magnificently clear now, though it is rarely free from clouds. This grand feature of the landscape, the most varied in outline of all the limestone mountains of Switzerland, is the last link of a chain of Alps, and 7,000 feet high. Its position seems to give it the dignity of storm centre of the district; often, when Rigi is peaceful and smiling, Pilatus is cloud-capped and shrouded in vapour, or there is heard the reverberation of the thunder amongst its peaks.

To the south-east is the St. Gothard range, with its snowy summits; in the near foreground the lovely lake with its graceful curves and beautiful terraces; and beyond and around are peaceful valleys and well-wooded slopes, the whole scene being indeed the beautiful sublime, especially under the perfect atmospheric conditions in which it was our good fortune to behold it.

Early next morning we set off for a five days' tour, which teemed with interest, and embraced every variety of scenery from 1,400 feet above sea-level, to beyond the line of perpetual snow.

Sailing down Lake Lucerne, we call at two or three quaint and picturesque little places, and then land at Vitznau, from whence the Rigibahn or Rigi railway starts. The train is constructed of one carriage, and an engine which is behind and uncoupled. The carriage has glass at each end, but none at the sides, which are open from half-way upwards; the full complement for each train is thirty-two passengers. As the speed at which we travel is only about three miles an hour, there is ample opportunity for looking about. The line ascends the south side of the mountain and has a very steep gradient—in many places of 1 in 5, or occasionally of 1 in 4. It proceeds by the edge of precipitous cliffs, passes through orchards of large-fruited chestnuts, and soon affords delightful views of the lake and its embosoming mountains.

Much to the amusement and interest of the other passengers, we took out our nets, and made attempts to capture insects as they flitted by. Though it was entomologising under difficulties, we secured several specimens, the most notable being *Zygæna scabiosæ* (very similar to *Z. minos*), and a fine male *Thecla ilicis*, the only specimen of the *Thecla* family we took during our stay in Switzerland.

By and by we pass through a tunnel, which pierces the conglomerate, and crossing a viaduct of wrought iron girders of considerable span, we proceed to the summit.

To me, the chief interest in the view from Rigi-Kulm lies in the lakes which cluster around its base. Their waters, when seen on a sunny but not cloudless day are a most remarkable colour—a blending of green and purple— and the shadow effects are wonderful. Such colour and such remarkable reflections I have never seen elsewhere, and conclude it was an affect which could only be seen from a great altitude.

After enjoying this view and the fine air for some time, we descended the south-east side of the mountain to Arth-Goldau, a station on the Saint Gothard Railway. Butterflies were flying about in great numbers, especially about 2000 feet down, and we secured *Argynnis aglaja*, *A. adippe*, *A. euphrosyne*, *A. amathusia*, *Melitœa athalia*, *Polyommatus hippothœ*, *Lycœna corydon*, *L. icarus*, *L. icarinus*, *L. medon*, and two of the *pieridœ* viz., *Rapœ* and *Napi*.

Of birds there were remarkably few, and indeed this scarcity of bird-life was most noticeable in all parts of Switzerland that we visited.

From Arth we travelled by the well-known and wonderful Saint Gothard line to Goeschenen.

By this time the weather which had hitherto been irreproachable, had become dull and showery, and our walk through the Schollenen gorge was under atmospheric conditions which harmonised with the scenery of that remarkable pass.

After walking through the pretty village of Goeschenen, we soon enter upon a scene of dreary desolation. Gaunt and grim the granite cliffs of this gloomy gorge tower above you, hang over you. Stern and sombre, with no trace of vegetation, these huge walls of naked rock press upon you. Grim forbidding solitudes: no bird wings its way hither to its nest, no hum of insect is heard, no sound of the wind in the pines; nothing but the noise of the brawling contentious Reuss, as with wild abandonment it casts itself against and madly leaps the great boulders which obstruct its course.

How appropriate to find a Devil's Bridge here, in such surroundings. I will not detain you with the legend, the chief interest lying in the harmony of association.

A few hundred yards from the bridge the road is strongly roofed to protect it from avalanches, and when we get through this tunnel the scene has changed. We are now in the pastoral valley of Andermatt—a grassy plain, as the name Andermatt (in the meadow) signifies.

In the quaintly irregular little village, 4,500 feet above sea level, we passed the night.

We make an early start next day for the Furka pass. On the nettles by the road side are batches of *V. Urticæ* larvæ in various stages of growth; and amongst the stones, and in the crevices are many ferns, including Oak, Beech, Parsley, Shield and the Maidenhair Spleenwort.

The ascent soon becomes continuous, and, as the day advances, insects sport about in all directions. On a patch of marshy ground we found *L. Semiargus (Acis)* settled, and by careful searching among the reedy grasses, we were able to obtain a very nice series. A chase up a grassy slope, where the beautiful *Star Gentian* abounded, resulted in the capture of *E. Pharte*—the only specimen of this insect taken. Presently we were excited by the sight of several specimens of the *Parnassius* family, which proved to be *P. Delius*. This insect closely resembles *P. Apollo*, but is usually smaller, and always more cream-coloured and opaque. It is much rarer and more local than *Apollo*, frequenting rough rocky uplands where it floats up and down the small Alpine streams.

The *Colias* family has a predilection for flowery banks or short turfy pastures- *Hyale* favouring the former, whilst *Palæno* and *Phicomone* prefer the latter. *Phicomone* was so plentiful and as widely distributed, though local, as *Hyale*. We secured a very fine series of this beautiful and variable insect. *C. Palæno* was exceedingly local, and the female much scarcer than the male. Of the former I took two specimens, one of which is particularly interesting as a probable post-glacial form, analagous to *Helice*, the well-known variation of *C. Edusa.** This dimorphism in the female would appear to be characteristic of the *Coliadæ*.

On the same short pastures that *C. Palæno* frequented, *Lycæna Orbitulus*, and *L. Optilete*, two of the smaller blues, were taken. *A. Plantaginis* (which shows considerable range of variation even in the few specimens we took) was taken with *C. Hyale*.

As we approached the snow-line insects became more and more scarce; the last species of butterfly to be taken being *Melitœa Aurinia* (*Artemis*), at an altitude of 8,000 feet and at six o'clock in the evening. It was exceedingly local, on short flowerless pasture, close to a stream. The flight of these insects, and indeed of all the *Melitæas*, is difficult to follow with the eye, as they keep very near to the ground. *Aurinia* is more puzzling than any other member of the family, its peculiar colour aiding in the deception.

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* The pale form of the ♀ is considered to be the type; the yellow form is the var. *Wernandi*. H.S.—Ed. B.N.

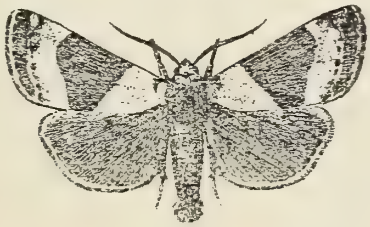
Any hymenopterists, who may be present this evening, will be interested to learn that a species of *Bombus* was observed flying briskly about a sunlit slope at the very head of this Furka Pass—8,000 feet above sea level.

Before retiring for the night, a short stroll was taken to the point of the Rhone valley fortifications, whence, under the light of the full moon, we had a view of the Matterhorn and Monte Rosa, and other peaks of that grand range of Alps.

(To be continued).

RANDOM NOTES ON BRITISH LEPIDOPTERA.

BY JOHN E. ROBSON, F.E.S.



Some time ago Mr. McRae, of Bournemouth, sent round in the Exchange Club Basket connected with this Magazine, some very beautiful varieties of *Cosmia trapezina*. The most striking of these he kindly lent me for figuring, and after an unprecedented series of accidents, in which drawing, engraving, everything in fact but the insect itself, was lost, I am at last enabled to present it to my readers. Though the figure is a very good one, it really does not convey an idea of the extreme beauty of the specimen itself. In colour it is pale-fawn, with the band deep velvetty black, very slightly sprinkled with fawn-coloured scales. It was taken at sugar in the New Forest, on 12th August, 1888. Concerning its capture Mr. McRae writes :—"It presented an appearance so totally unlike *Trapezina* that I had no idea it was that species until I had examined it on the following day. I took three or four other specimens off the same tree, at the same time, all having the band unusually dark, and all probably belonging to the same brood. In August, *Trapezina* usually swarms at sugar in the New Forest. I have often counted fifty or sixty on one tree, with an almost equal number of *Pyramidea*." I have seen some of these specimens, and no doubt they would be considered very good varieties, were it not that they are so completely eclipsed by the specimen figured, which is probably the grandest variety of this species in existence.

Obituary.

HENRY TIBBETS STAINTON.

Only eleven months ago, we had the pleasure of presenting our readers with a portrait of Mr. Stainton, and he has already gone from us, having died on 2nd December at the age of 70. Having so recently ("British Naturalist," Vol. 11, p. 44) given an account of his entomological work, it is unnecessary to refer to it again at length. Just at the right moment, when extra postal facilities, and the extension of the railway system gave greater opportunities for intercommunication among Entomologists, he brought out his "Entomologists' Annual" (1855), his "Manual of British Butterflies and Moths" (1856), and "The Entomologist Weekly Intelligence." These gave the impetus wanting, and made Entomology what it is to-day. He also arranged a series of "At Homes" for the winter season and conducted personally, excursions to various well-known localities in the summer, and so brought about that feeling of good fellowship that still obtains amongst us. His uniform courtesy to enquirers, and his geniality will never be forgotten by those who knew him. His works will survive him.

SIR RICHARD OWEN.

It is a curious coincidence that in the same number in which we give a portrait of Professor Flower we have to announce the death of his predecessor. In many respects the career of the two naturalists were similar. Both were born and educated in the provinces, both turned their attention to anatomy, and both became surgeons, both became curators in the Hunterian Museum, and finally both became Superintendents of the Natural History Department of the British Museum.

Sir Richard Owen, K.C.B., M.D., D.C.L. LL.D., F.R.S., &c., &c., was born at Lancaster, July 20th, 1854, and studied at the grammar school there, he subsequently matriculated at Edinburgh, and entered the Medical School at St. Bartholomew's Hospital, became a member of the Royal College of Surgeons of London in 1826, aud began life as a general practitioner in Serle Street, Lincoln's Inn Fields, but his subsequent appointment, on Mr. Abernethy's recommendation, to the post of Assistant Curator of the Hunterian Museum, led him to devote his attention exclusively to the study of comparative anatomy. In 1834 he was appointed to the Chair of Comparative Anatomy at St. Bartholomew's Hospital, and soon afterwards he married the only daughter of his colleague, Mr. William

Clift, Curator of the Hunterian Museum. In 1836 he succeeded Sir Charles Bell as Professor of Anatomy and Physiology in the College of Surgeons, being appointed by the college in that year as the first Hunterian Professor. Professor Owen's connection with the College of Surgeons ceased in 1856, on his being appointed Superintendent of the Natural History Departments (Zoology, Geology, Mineralogy) in the British Museum. He has advocated the provision of adequate galleries for the exposition of these collections in his "Discourse on the Extent and Aims of a National Museum of Natural History." For some years he was Lecturer on Palæontology in the Government School of Mines, Jermyn Street, and Fullerian Professor of Physiology in the Royal Institution of Great Britain, but was compelled, on account of failing health, to resign these offices. Amongst the first great works which he undertook were the "Descriptive and Illustrated Catalogue of the Specimens of Physiology and Comparative Anatomy," the "Catalogue of the Natural History," that of the "Osteology," and that of the "Fossil Organic Remains," preserved in the Museum of the Royal College of Surgeons. Discerning in a fragment of fossil bone from New Zealand, submitted to him in 1839, evidence of a bird more gigantic than the ostrich, Professor Owen published an account of it; transmitted copies to New Zealand, and obtained evidence in confirmation and extension of his idea, which occupies many successive parts of the "Transactions" of the Zoological Society. In that for 1855 he propounds his theory of the extinction of species on the principle of the "contest of existence" through the operation of extraneous influences. The genera of birds thus lost by "natural rejection" are Dinornis, Aptornis, Notornis, Cnemiornis, &c. Concluding in the work "On the Nature of Limbs" his researches on the unity of plan of animal organisation, the author is led to regard species as due to secondary cause or law, continuously operating and producing them successively. Professor Owen has written many other works. His later researches have been on the extinct animals of our principal colonies. In 1876 his work on "The Fossil Reptilia of South Africa," with seventy plates, was published by the trustees of the British Museum. In 1877 Professor Owen brought out, at his own cost, a work "On the Fossil Mammals of Australia, and on the Extinct Marsupials of England," two volumes, 4to, with 132 plates and many woodcuts. He is also the author of an enlarged work "On the Extinct Wingless Birds of New Zealand." He was one of the founders, and first president of the Microscopal Society; is a Fellow or Associate of most of the learned societies or scientific academies at home and abroad; has received the Cross of the Legion of Honour; is a Chevalier of the Order of Merit of Prussia, and one of the Eight Foreign Associates of the French Institute. He was created a Companion of the Bath, June 3rd, 1873, and shortly afterwards made a K.C.B.; and in January, 1879, he was elected a Foreign Member of the Berlin Academy of Science.

Errata.

Vol. 11, p. 254, line 6, instead of "*Inula dyseuterica*, or as it is sometimes called *Conyza squarrosa*" read *Inula dysenterica* and *I. squaraosa*, or as it is sometimes called *Conyza squarrosa*."

General Notes.

Cremastogaster Scutellaris.—My wife purchased some apples at a shop in Plymouth about the 8th November last, a few days after was about to make use of one, she discovered a hole where apparently an apple moth larva, *Carpocapsa pomonella*, had escaped, to her surprise found the core inhabited by the above named Ant, a female; and a Cicade in the pupa stage, both were sent to Mr. E. Saunders, who identified the Ant and remarked "The Homopteron I do not know, but it reminds me of an immature *Issus*." He also drew my attention to the fact that, I am not the first to record its capture in England; by a note in the E. M. M. for July, 1889. Dr. Mason exhibited a number of specimens at the meeting of the Entomological Society of London on the 5th June, his specimens were all taken in a fernery, at Burton-on-Trent, and supposed to have been imported from the South of Europe, with cork.—G. Bignell, F.R.S., Stonehouse, Plymouth, *31st December, 1892.*

The Season in Northumberland, 1892—I see that the Collectors in the South of England appear to have had a good season. In this part of Northumberland it was a bad one, about the worst that I ever collected in. The weather in May was dull and cold, and the rainfall was over four inches. June gave us nearly four inches of rain, whilst the 7th, 8th, and 9th of that month were the only hot days we had all the summer. On those three, the Thermometer registered in the shade 84, 82, and 87 degrees respectively. July was a dull month, but with less rain than June. August, dull and wet, rainfall, 4½ inches. September was about an average month, and October excessively wet, the rainfall being over 5½ inches.—John Finlay, Morpeth, Northumberland.

Demas coryli and Numeria pulveraria.—In Sept., 1891, I bear some larvæ from Hazel that were new to me, and this year I have reared from them *Demas coryli* and *Numeria pulveraria*, both new to me in this part of the country.—John Finlay, Morpeth.

11 FEB 97

EXCHANGE.

Duplicates.—Pudorina, Umbrosa. Immutata, Statices. A. Cratægi,* Anachoreta,* etc. Desiderata—Rufina, Lota, Spadicea, Fimbria, Croceago, Citrago, Dahlii, Haworthii, Saucia, Subtusa, Oxyacanthæ (dark), Herbida, Rhizolitha. Myrtilli, Parthenias, Verbascalis, etc.—J. W. Tutt, Westcombe Hill, S.E.

Exchange—Marine Shells from New Zealand offered for foreign land and fresh-water shells, Microscopic slides illustrating useful or noxious insects, or botanical or entomological lantern slides.—W. A. Gain, Tuxford Newark.

Exchange (Duplicates)—E. minutata var. Knautiata Gregson, and many common species. Desiduata. numerous. C. E. Stott, Manchester Road, Bolton-le-Moors.

Exchange (Duplicates)—Viretata, lobulata, E. edusa, solidaginis, suffusa testacea, loniceræ, citraria, pyramidea, cardui. selene. euphrosyne all on black pins. Desiderata, very numerous.—P. W. Abbott, Four Oaks, near Birmingham.

Duplicates—Fine Blandina, Davus (Scotch), Euphrosyne, V. urticæ (Scotch), Mendica, Fulginosa and borealis, Loniceræ, Capsincota, Myricæ, Menyanthidis, Adusta, Rectilinea, H. urticæ, Duplaris (dark). Rurea (vars.) Polyodon (dark). Plantaginis. Conflua. Plecta, Wavaria, Maculata, Atomaria, Pinetaria, Lobulata. suffumata, Corylata (light), Testata, Populata (vars), Fumata, Atomalis, Hastiana, Miniscrana, Cosmophorana, Ochracella.—T. Maddison, South Bailey, Durham.

Duplicates.—Ægon. Blandina, Davus, Tiliæ, Loniceræ, Filipendulæ, Petasitis, Conigera, Tritici, Carpophaga, Polyodon (black vars.) Festiva—vars. Biundularia, Zonaria, Silaceata, Ulmata, Basilinea, Umbrosa, Gothica, Rubricosa, Gracilis. Albicolon, Rurea, and vars. Testacea (dark and light), Micacea, V. aureum, &c., &c. Desiderata, very many common species to enlarge series.—John E. Robson, Hartlepool.

Exchange (Duplicates)—Velleda, Mundana, Fulva, Nictitans, Lithoxylea, Rurea, Graminis, Oculea, Fasciuncula, Literosa, Furuncula, Arcuosa, Macilenta. Rufina. Chi, Protea, Candidata, Aversata, Vulgata, Olivata, Rubiginata. Ocellata, Badiata, Immanata, Fulvata, Lutealis, Prunalis. Decrepitalis (2 or 3, fair). Cembræ, Dubitalis, Murana, Octomaculana. Bertrami, Trigonodactylus, Caudana, Subjectana, Rubiella Albulata, Menthastri, Basilinea, Bisetata, and Aprilina.—A. Adie Dalglish, 21, Princess Street, Pollockshiels, Glasgow.

Duplicates.—Suspecta. Thalassina, Plecta, Pisi, Pudorina. Sparsata, Loniceræ, Basilinea: Rurea and vars, Brunnea. Gemina. Augur. Strigilis, Segetum, Trapezina, Oleracea, Xanthographa, Comes, Senex (few), Ulmata, Festiva, and Blomeri. Desiderata—Numerous, and Birds' Eggs.—E. G. Potter, 19, Price Street, York.

Birds' Eggs for Exchange.—Great Plovers. Razorbills, Guillemots. Jackdaws, Magpies (variable series or clutches), Sand Martins, Com Terns, Puffins, Blackcaps, Partridges, Lapwings, Moor Hens, and one Golden Plover.—Wanted Cuckoo's eggs with clutches, and many other species.—E. G. Potter, 19, Price Street, York.

CHANGE OF ADDRESS.

W. E. Collinge, *from* St. Andrew's, N.B., *to* Mason College, Birmingham.

Linnæus Greening *from* Bewsey Road, Warrington to High Lea, Overton, Frodsham, Cheshire,

MEETINGS OF SOCIETIES.

CITY OF LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY Meets on the First and Third *Tuesdays* in each month, at the London Institution Finsbury Circus, E.C., from 7.30 to 9.30 p.m. The following programme has been arranged for the winter. January 3rd.—Pocket Book exhibition. January 17th—"Stauropus fagi," by Mr. A. F. Bayne.—A. U. Battley and J. A. Simes, *Hon. Secs.*

ENTOMOLOGICAL SOCIETY OF LONDON, 11, Chandos Street, Cavendish Square, W. Wednesday, January 18th, 1893, at 7 o'clock in the evening. Annual Meeting, Report of Council and Officers for ensuing year.

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TO CORRESPONDENTS.

A Portrait of T. D. A. Cockerell, of Jamaica will appear in the next part.

This part contains a portrait of Professor Flower and four extra pages.

Arrangements are now completed for continuing the Molluscan Section. W. A. Gain, Esq., of Tuxford, Newark, has kindly undertaken the Land and Fresh Water Mollusca, and Brocton Tomlin, Esq., of The Green, Llandaff, will attend to the Marine Section. Communications may be made to either of these gentlemen. All letters requiring a reply by post should contain stamp.

The Section for Coleoptera is conducted by G. A. Lewcock, Esq., 73, Oxford Road, Islington, to whom also direct communication may be made.

Mr. Lewcock also represents the Magazine in London, and will receive subscriptions, papers and notes for publication, &c., &c.

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THE

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AN

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OF

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THE PTEROPHORINA OF BRITAIN.

BY J. W. TUTT, F.E.S.

(Continued from Vol. III., p. 5).

Pterophorus monodactyla, Linn.—This common and variable species appears to be on the wing throughout the year except for a short time at the end of May and early in June. Hybernated specimens are met with in the early months of the year, and freshly-emerged specimens may be found from June to November or December.

SYNONYMY—*Monodactyla*, Linn. "Sys. Nat.," X., 542; F. S., No. 1452. *Pterodactyla*, Hb. 4; Tr. IX., 2, 242; Ev. "Fauna Vol.-Ural.," 607; Zell. "Isis," 1841, 846; "Linn. Ent. Zeit.," VI., 377; Dup. XI., 314, 2; Haw. "Lep. Brit.," 475; Stphs. "Ill." IV., 372; H.-S., 25, V., p. 373; Frey 415; Sta. "Man.," p. 443.—This species has been generally known in Britain as *pterodactyla*, a name now applied to the species formerly called *fuscodactyla*. The name *monodactyla* is very appropriate, and it has been previously remarked how peculiar is the appearance of the insect when at rest with its wings folded in such a manner as not to leave even the semblance of its "plume" character. With regard to the synonymy of this species I wrote:—"I would point out that the Linnæan description of *monodactyla*, 'Systema Naturæ,' 10th edition, p. 542, '*Alucita*, alis patentibus linearis indivisis,' is unsatisfactory, as far as the 'indivisis' is concerned. But the description, 'inferiores fere tripartitæ,' etc., in the 'Fauna Suecicæ,' p. 370, No. 1452, makes it quite clear that it cannot belong to the *Agdistis* group" ("Entomologist's Record," etc., Vol. I., p. 91). Dr. Jordan refers this species to *monodactyla* following Wallengren, and writes:—"Of this genus, Sweden and England alike possess one species, the well-known *pterodactylus*. Wallengren believes this to be the *monodactyla* of Linné, and hence calls it *Pterophorus monodactyla*. The two well-known varieties, in one of which the upper wings are light cinnamon-brown, and in the other a light greyish-white, more or less tinged with reddish, seem to be both described" ("Entomologist's Monthly Magazine," Vol. VI., p. 149).

IMAGO—The anterior wings are divided into two lobes and are of variable colour, some specimens being pale whitish grey, others dark grey, while frequently the colour is ochreous, or red. There is a black spot near the centre of the wing and another at the end of the fissure. That near the centre of the wing is occasionally extended so as to form a dash, the species thus being inclined to follow in markings those of *lithodactyla*. The hind wings are grey in colour and divided into three plumules. The head and thorax are of the colour of the fore wings; the abdomen, the colour of the hind wings, with a fine median blackish line. Stainton's diagnosis is:—"10'''-1''. F.-w. brown or pale grey, with a small dark blotch before the fissure ; the first two feathers of h.-w. slender, the third feather rather long" ("Manual," II., p. 440). The type is thus described by Linnæus :—"Alucita alis patentibus, linearibus indivisis" ("Systema Naturæ," X., p. 542). He further adds in the "Fauna Suecicæ," p. 370.—Alæ cinereæ : Superiores lineares, indivisæ, subtus caniculatæ, sub quibus inferiores absconduntur. Inferiores fere tripartitæ : ramo postico usque ad basin diviso." In the "Entomologist," Vol. XVIII., p. 279, we read :—"Lord Walsingham in his "Pterophoridæ of California and Oregon," writing of *Pterophorus monodactyla* (p. 40), says :—"One distinguishing peculiarity of this genus and species, whether in Europe or in America, by which it may always be immediately recognised, is the presence of brush-like tufts of appressed-like scales on the upper side of the hind feet. In good specimens these are noticeable on each side of the tarsal joints below the second pair of spurs. . . . It is remarkably constant, and does not occur, so far as I am aware in any other genus of the *Pterophoridæ*" ("Entomologist," Vol. XVIII., p. 279).

Variation—The species varies very considerably in colour. The ordinary grey form is the Linnæan type, whilst the redder form is the *pterodactyla* of Hübner, but not of Linnæus, which is Stainton's *fuscus*. The Irish specimens which I have received from Mr. Percy Russ of Sligo, are particularly bright in colour and large in size, but the most remarkable local form of this species with which I have yet met is the Wicken Fen form, and even now it is somewhat difficult to believe that some of the specimens are really this species. This race, for which I propose the varietal name of *paludis*, is much smaller than the ordinary wood and garden form, although there is some variation in the species *inter se*, the larger appearing more like typical *monodactyla*, the smaller, with their shorter wings (which look broader in proportion), having every possible superficial appearance to the members of the genus *Leioptilus*, to which, without the larger specimens, one would be certainly inclined to refer them. These specimens have all been captured in 1891-92, between July 25th and August 10th, and it is probable that they feed on *Convolvulus* in the Fen, as a few plants grow where the specimens occur. The clear ochreous form, which appears to occur more commonly in the most open localities frequented by this species, has apparently not been specially described ; but the reddish form, inclining to cinnamon-brown, is certainly the *pterodactyla* of Hübner. The forms we get appear to be :—(1) Grey = type = *monodactyla*, Linn. ; (2) Ochreous = var. *ochracea* ; (3) Reddish = *pterodactyla*, Hb. ; (4) Small local Fen form (grey or ochreous rarely) = var. *paludis*.

Larva—Of the larva of this species, Mr. Porritt writes :—"During last summer a young 'plume' larva, which proved to be this species, was accidentally brought in with some *Convolvulus* I had gathered for a brood of larvæ of *P. pentadactyla*. By the middle of August it was full-grown, when I described it as follows:—Length, when at rest, about five-eighths of an inch, and stout in proportion. Head, polished and rather small, narrower than the second segment. Body, uniform and cylindrical, tapering a little posteriorly. Segmental divisions, well-defined and deeply cut ventrally; each tubercle emits a tuft of short but rather strong hairs. Ground colour, bright yellowish-green, more decidedly green on the back; head, pale yellow; the mandibles light brown. A fine but clear yellowish-white line forms the dorsal stripe; there is a much broader stripe of the same colour along the spiracular region, and the space between it and the spiracles is speckled with streaks and spots of the same colour. Spiracles black, hairs greyish. Ventral surface, legs and pro-legs uniformly pale green" ("Entomologist," Vol. XV., pp. 90-91). Of a rather strange fact related with the habits of this species, Mr. Porritt writes:—"In the first place the larva of *Pterophorus monodactylus* is supposed, so far as I know, to be solely a *Convolvulus* feeder; but here, though it is common enough, I can only find it among ling (*Calluna vulgaris*) or bilberry. It occurs freely in September on the high bleak exposed moors, always about ling or bilberry (but where *Convolvulus* certainly does not grow), and there is no doubt it feeds on either or both of these plants. I have sometimes tried to make another species out of it; and as there were, and I suppose still are, two specimens without a label, at the foot of the series of *monodactylus* in the Doubleday collection at Bethnal Green, of one of our moorland forms, it is evident the late Henry Doubleday was a little doubtful about them. As, however, the variety occurs with all ordinary well-known forms the species, they are clearly only *monodactylus*" (Entomologist's Monthly Magazine," Vol. XXI., p. 208). Referring to the species, Mr. South writes:—"Mr. C. G. Bignell, of Stonehouse, was kind enough to send me larvæ of this species on June 17th this year. Some of them were nearly full-grown, others quite small. He found them in a garden feeding on the small garden convolvulus (*Convolvulus minor*). When the supply of food sent with them was exhausted, shoots of the large convolvulus (*Convolvulus major*) were given them, which they took to readily, as also they did afterwards to the small bindweed (*Convolvulus arvensis*). The larvæ pupated between July 26th and July 5th, and the moths appeared between the 6th and 30th of July." He further adds:—"In the autumn of 1876 I observed *P. monodactylus* flying at dusk in some numbers around and about a clump of large bindweed (*Convolvulus sepium*). An examination of the plant next day resulted in the finding of several pupæ and larvæ" ("Entomologist," Vol. XVIII., p. 278).

PUPA—Mr. Porritt does not describe the pupa, but states that it "is attached by the tail only, and laid flat along the top of the cage" ("Entomologist," Vol. XV., p. 91). The pupa is thus described by Mr. South: "Green at first, afterwards pale dingy-brown, more or less suffused with reddish-brown along the dorsal area. Dorsal and lateral lines interrupted, blackish-brown; warts and hairs as in the larva except that some of the dorsal series are blackish. Head flattened marked with brown, and thickly covered with short hairs. Wing-cases yellowish-green, faintly streaked with brown. Attached by anal segment to stem of food plant or other object near" ("Entomologist," Vol. XVIII., p. 277).

TIME OF APPEARANCE—I have met with this species every month in the year except in January. I have found quite freshly emerged specimens in my own garden in November and December, and hybernated specimens in February to June. About July 7th, apparently freshly emerged specimens are taken almost every year in Chattenden, and specimens continue to emerge until December. I used to think there was a succession of broods throughout the summer and that some of the hybernating specimens laid their eggs early, whilst others did so much later, and that the early-laid ova produced the early moths, the later ones producing the later moths, but close observation of a little colony which has existed for some years on a couple of *Convolvulus* plants, in my garden, has quite convinced me that there are two distinct cycles of existence in a year, the first moths emerging from July to September, these laying eggs which hatch and emerge as moths from October to December, and that it is the specimens of the latter brood which hybernate and lay their eggs in the spring. There appears to be a general tendency among our "plumes" to form double broods, but very few of the species hybernate in the perfect state.

HABITAT—Perhaps "everywhere" can be better said of the distribution of this species in Britain, than of any other. It occurs abundantly in all our woods in the south of England. It is found in the Fens, and on the moorlands of the Midlands and North of England. It occurs commonly around Glasgow and in Aberdeenshire, also in Wales. It extends into Sligo in Ireland, and I doubt very much whether there is any part of the British Islands where its food-plant grows, where the species is not to be found. Probably this is the most generally distributed in Britain of all our "plumes." In Staudinger and Wocke's 'Catalog,' the localities given are "Europe, Armenia, Hyrcania (North Persia)," without limitation as to the species being restricted to any particular parts. It appears to occur from the Arctic circle, to the borders of the Mediterranean Sea; on the Swiss Alps; and to extend well beyond the Urals into Asia. Altogether it has a very wide area of distribution.

Leioptilus, Wallengren.

This genus, of which we have four British species, contains, according to Dr. Staudinger, ten Palæarctic species, and according to Dr. Jordan, 15 or 16 Nearctic species, but none are common to both continents. *Brachydactylus* is included by many authors in this group, but by Wallengren was removed into the genus *Pselnophorus*.

The genus is thus characterised by Wallengren :—" Antennæ of middle length, those of the male at least very finely ciliated, with the basal joint slightly thickened, Forehead obtuse, the feathers forming no cone. Palpi either shorter or very slightly longer than the head, slender, pointed, a little rounded, sometimes bending downwards at the last joint. Tibiæ all slender, not thickened. Spines of the posterior tibiæ almost equal. Anterior wings cleft to the third part of their length, no posterior angle to the upper segment, and that of the lower segments also wanting, or else most indistinctly marked. Segments of the posterior wings slender, with fringes of moderate length, the third segment without any black scales in the fringe. Anterior wings almost flat, posterior margin not toothed, deflexed, so as to enclose the inferior wings when at rest, as in the preceding genus" (" Entomologist's Monthly Magazine," Vol. VI., p. 149).

An abnormal American species, which is doubtfully referred to this genus by Lord Walsingham, is *L. parvus*. The palpi of this species are described as :—" Long, well clothed, sharply pointed, and twice the length of the head." " This is certainly," Dr. Jordan says, " very different from the usual palpi of *Leioptilus*, which we may define as shorter or slightly longer than the head, delicate, pointed, almost cylindrical, with the third joint sometimes drooping " (" Entomologist's Monthly Magazine," Vol. VI., p. 119).

SWITZERLAND—A NATURALIST'S PARADISE.

BY W. R. SCOWCROFT.

(Continued Vol. III. from p. 17).

There is deep solemnity—a grandeur and dignity in such surroundings. Above you the heavens, lighted by the full orb of " that moist star upon whose influence Neptune's empire stands ; " an atmosphere of that intense night-blue only to be seen at high altitudes, and around you great glaciers and snow-clad granite peaks.

The next morning was cloudy, and for a short time accompanied by heavy rain. A descent of a thousand feet or more was made into the Rhone Valley before we saw any insects on the wing. Here on a grassy slope, and in the bright gleams of sunshine, both moths and butterflies were numerous—amongst them being *Argvnnis pales*, *Erebia lappona*, *E. tyndarus*, *Procris statices*, *C. lutcaria* and *S. aurita* var. *Ramosa.*

A. pales is, so to speak, one of the most "individual" of the *Argynnidæ.* It has two forms; that of the higher Alps being smaller and more angular than that taken below 7,000 feet.

E. lappona is interesting in that precisely the same form occurs in Norway. As is the case with *E. tyndarus*, its flight is a peculiar floppy one.

S. aurita var. *Ramosa* is very rare and local, only occurring above the pine zone, and the only occasion on which we came across it was in this descent into the Rhone Valley.

Coleopterists will be interested in the specimens taken by my friend within a few yards of the renowned Rhone glacier, more than 7,000 feet above the level of the sea. They include *Althous Niger*, *Diacanthus æneus*, *D. rugosus*, *Calathus melanocephalus*, *Anchomenes melanocephalus*, *Cicindela gallica*, *Carabus arvensis*, *Otiorhyncus scabiosus*, *Oriena niger*, *Pterostichus choromela*, *Harpalus vulgaris*, *Rhagium bifasciatum*, a species of *Malthodes*, and several species of *Aphodii.*

We passed the night at the Rhone Glacier Hotel, and made an early start on the morrow for Meirengen.

High above the Rhone Valley, and shutting it in on the north, runs a great mountain chain, the most easterly pass in which is formed by the saddle of the Grimsel. This mountain slopes down to the valley southwards for 1,300 feet, under the name of Maienwand. Being here completely sheltered from the north, the growth of Rhododendrons, Gentians, Anemones, and other flowers, is most luxuriant, and insects flit about in large numbers. The extreme fertility of this mountain slope is most remarkable, when we consider its position in the centre of the great glacier system of Switzerland. It was a source of regret to me that we did not stay longer there. The day was perfect for entomology, and we might have made some noteable captures, though it would have been under considerable difficulties as the hill side was so steep.

The most interesting insect taken was *Melitæa cynthia*, the only fritillary (with the exception of *M. iduna*, in Lapland), with white patches on the upper side of the wings. It is only to be taken above the tree-limit, and near the snow-line.

Of the mountain *Erebias*, I took a small but select series of the very local and rare *E. mnestra*, also specimens of *E. melampus*, and *E. epiphron* var. *Cassiope.*

There were many *C. hyale* flying about, and two specimens taken are noteworthy for their variation in colour and general features.

The *Melitœas (Athalia* and *Dictynna)* were also abundant, but the pursuit of all insects was difficult, almost dangerous, owing to the steepness of the ascent; and although aided by a good alpenstock I had many falls before reaching the summit. My friend and I did not see each other again for over two hours.

As the crest of the mountain was gained, what a strange change of scene was revealed. Behind was summer with its glory of light and colour of life—a scene filled with the joy of living; while before me was stern savage winter, ice and snow, a bleak Alpine lake, known as the Lake of Death, and cold, grey, granite, snow-creviced boulders, with here and there a few blades of coarse grass struggling for life.

At the top of the ridge, which the bright sunshine lights up and warms, brilliant satiny-black little moths *(S. revayana)*, sun themselves upon the snow. To look at those little creatures dead, and set out in a case, gives one no conception of their brilliancy and beauty under direct and reflected light of sun and snow, as they dart briskly hither and thither, or settle for a moment on the gleaming white. Does a bright surface receive more heat than a dull one? for we find that *Psodos trepidaria*, as well as *S. revayana*, has a bright satiny surface, and these insects are often found in the same kind of locality—a locality in which it would seem to be an advantage to the insect to be able to absorb as much heat as possible. On this same sunny snow-clad ridge, a specimen of *Colias hyale* dared to wing its flight. It was a male, and in both colour and markings, varies from the type.

Under stones by the edge of the lake, my friend found specimens of the genus *Oriena*, the specific name of which we have been unable to determine, although we have had access to Mr. Melvill's fine Coleopterous collection.

But on the northern slope there is no sign of life. The change is startling, and probably unsurpassed elsewhere in its suddenness. A strange feeling of loneliness comes over one, and it is a relief to reach the hospice, and greet one's kind once more.

For the next few miles I had the companionship of a middle-aged German—a genial well-informed man, home from the Cape for a few months holiday. The good-natured contempt with which he looked upon the pursuit of insects was amusing, and a grunt of satisfaction was evolved when pursuit ended in failure.

Soon after leaving the hospice my attention was attracted by a flight I was not acquainted with, and the specimen proved to be *Æncis aëllo*, and is distinctly one of the most memorable of our Swiss captures. The *Æncis* family connects the *Erebias* with the *Satyrs*. It consists of five species only, none of which are found in Europe, outside of Scandinavia and the extreme north of Russia and Lapland, except *Aëllo.* It is said to appear but once every two years in Switzerland, and is one of those interesting problems which our science of entomology occasionally presents to us.

The valley through which we were walking was narrow and bleak, with little or no vegetation, and very few insects. To the geologist it is one of the most instructive valleys in Europe, containing as it does, so many evidences of glacial action. As we proceed, the bare granite rock scenery gives place to grass and moss, and the Alpen Rose, and bye-and-by the pine-zone is reached, and butterflies become more plentiful. A few Blues were taken, notably *Lycæna hylas* and *L. baton*, also *Argynnis thore*, and on stony ground *Erebia lappona* was plentiful. Flying towards the pines was a fine specimen of *P. podalirius*, which however, never descended to within reach. But the insect which occurred in greatest numbers was *Melitæa dictynna.* This species has a penchant for settling on the roads, or on stones, as the *Vanessas* do. The beautiful series before you to-night, were mostly taken here. *Dictynna* very closely resembles *Athalia* at times, even in the markings of the under-side, but is usually richer and darker, especially in the hind wings.

While I was netting these insects my friend came up, and we walked on together to Guttanen, through scenery which testified to the power of avalanche and torrent—debris lying all around us.

It was when approaching this little village, through a long valley, that we first met with those exceedingly local species *Lycæna arion* and *L. alcon*, flying about with numerous *Polyommatus hippothœ.* The specimens of this latter insect taken here, are interesting, as differing from those captured on Rigi, in respect of the more or less entire absence of any spot on the fore-wing of the male. One specimen of *Polyommatus* netted here, Mr. Melvill has christened *Dorilis.* I consider that there are at least two species in my series of *Hippothœ*, but have been unable so far to determine them. Feeling that we had done enough walking and chasing for one day, we took a conveyance from Guttanen to Meirengen, and invited our German friend to join us.

Sleeping at the latter place, we proceeded next morning by train along the Brunig Pass to Lucerne, passing through very fine scenery, especially along the Uri arm of the Lake of Lucerne.

In the late afternoon we sailed to Weggis, the best starting point for the ascent of the Rigi on foot. We found the climb very fatiguing, but eventually reached our destination about 9 p.m. This was Rigi Kaltbad Hotel, 4,700 feet above the sea level, where we had decided to stay for the remaining four days of our holiday, and to devote ourselves to the entomology of the mountain.

The time was utterly inadequate for the work, and my report deals only with the south, south-east, and south-west sides, and above 2,500 feet. At an altitude of 5,000 feet, and on coarse pasture land, we chased, but failed to capture *Papilio podalirius*; on the same pasture, but lower down *Vanessa urticæ* was very much in evidence, a few *V. cardui* occurred, and one perfect specimen of *V. Io*, gladdened our eyes, but refused to enter the net. Between 4,700 and 4,000 feet *Polyommatus hippothoæ* flitted about the meadows and sunny banks, *Plusia gamma* was common, and we took one specimen of *P. bractea.* On more barren ground, and in marshy hollows *Cœnonympha pamphilus*, *C. darwiniana*, and *C. satyrion* were more or less plentiful, as also were *Lycæna alsus* and *icarus*; *Parnassius apollo* and *Aporia cratægi*, frequenting railway banks or grassy slopes. Of the last named insect, my friend had five specimens in his net at one time.

In conversation with me, on Switzerland and its lepidoptera, Mr. Melville mentioned an interesting fact he had observed during one of his visits to this country, viz. the cannibalistic proclivities of *A. cratægi*. One of these insects had been trodden upon, and scores of its kind were settled on, or circled round the savoury or unsavoury morsel. The few that had sucked the juices appeared to be stupified thereby, and when disturbed only flew a yard or two away. Even next day numbers still gathered round the spot. Locally on the south-west side of the mountain *Erebia ligea*, *E. stygne*, *E. æthiops* (or *medea*), *Leucophasia sinapis*, and *Argynnis euphrosyne*, flitted or floated about a grassy slope, flanked by trees. This locality lives in my memory owing to the *mauvais quart d'heure* I had amongst the very persistent and insistent flies, which by stings and irritations made life there unbearable, and compelled me to retreat. Descending in a more southerly direction I came to some ground which was a glory of *Fritillaries* and *Blues*, *A. aglaja* and *A. amathusia* floated around me in scores; *A. euphrosyne* was present, though not plentifully, and *A. ino*, one specimen; hundreds of *Lycæna corydon* flew about in all directions, *L. medon*, *L. alsus*, *L. damon*, *L. icarus*, *L. bellargus*, sported amongst the flowers, ferns, and shrubs of this wood-flanked sunny hill side.

Most of the bntterflies of the south-east slope, I have previously mentioned in the account of our descent to Arth Goldau, but I have to add *Argynnis niobe*, *A. eris*, and *Melitæa dictynna*; and of moths *Macroglossa stellatarum*, *Zygæna loniceræ*, *Z. achillæ*, *Z. filipendulæ*, *Melanippe hastata*, and other *Geometers*, *A. menthastri*, *D. russula*, and *E. glyphica*. Of Coleoptera we secured *Hoplia farinosa* and *horticola*, *Chrysomela cerealis*, *Anthophylax quadrimaculatus*, and several species of *Oriena* and *Telephorus*.

I have not thought it desirable to encumber my paper with the names of all insects taken, but have preferred to append a full list. I may say here that during our holiday of nine working days we took 159 species of Lepidoptera, viz.: 70 butterflies and 59 moths; also 40 species of Coleoptera.

To live in that pure exhilarating air, surrounded by a scene of ever-changing beauty, was to be lifted out of one's self, to forget the small worries of life, to be in a new world. Night, with its starlight serenity, the silence broken only by the jingling tingtang of the cattle-bells, mellowed and made musical by distance; morning, with its mists and mystery—mountain and lake not yet unveiled; then the veil is lifted, and the children of Niobe are seen resting on the breast of the mountain, on the bosom of the lake—little clouds soon to be dispersed before the searching gaze of the fiery god of day. How pure a purple the islets are in the morning haze!

A holiday in such a country is a liberal education. There one realises the stupendous power of the great slow silent forces which have moulded, or do mould, our rock-built earth. There the botanist can trace successive zones of floral life, up to heights where no hardiest plant can live. How large the flowers are, and how rich their colour! Crocuses and anemones clustering round the snow left in the hollows; lovely star gentians of purest sapphire blue, most truly floral gems; cheery pink primulas; hardy rhododendrons clothing the higher Alpine slopes, and in the distance resembling our glorious Scotch heather; and, springing from the ice itself, the beautiful Alpine auricula.

And to the entomologist, what a treasury of insect beauty is Switzerland! Who could forget the first sight of *Parnassius apollo* as, at calm summer noontide, it floats on the buoyant air with wings expanded motionless. What a delight to a lover of insect life and beauty to be in the midst of scores of sunny-brown *Fritillaries*, with their graceful swiftly-gliding motion; or amongst Blues reflecting the sky in all its moods. What a charming sight it is to see the pearly-blue *Corydon* assembled in scores by the side of a trickling streamlet to refresh themselves in the heat of the noon-day; or multitudes of those beautiful diurnal fireflies (the *Zygænæ*) making a bee-line through the sunny air; or *Stellatarum* poised with lightning-motioned wings above the flower which yields it nectar; bright-eyed *Mæra* sporting round the rocks it so affects; and brilliant Coppers flying through the flowery meads.

These are the treasures which gladden the eye and quicken the pulse of a lover of nature. A holiday such as I have described leaves its impress for a lifetime. Switzerland—what beautiful visions, what pleasant thoughts, that word will ever call to remembrance. Stored up in our memories, my friend and I have a fund of happy experiences, to draw upon in later years. It is not often given to travellers to see a mountainous country under more perfect conditions than we saw Switzerland, and when we consider the variety of its scenery and the interest of its geological formation, the luxuriance and diversity of its flora, and the abundance and multiformity of its insect fauna, we cannot better describe this beautiful country than in the words with which I commenced my address—Switzerland, a Naturalist's paradise.

Reports of Societies.

ENTOMOLOGICAL SOCIETY OF LONDON.

18th January, 1893.—*The Sixtieth Annual Meeting.*—Frederick DuCane Godman, Esq., F.R.S., President, in the chair. An Abstract of the Treasurer's accounts having been read by one of the Auditors, the Secretary, Mr. H. Goss, read the Report of the Council. After the ballot it was announced that the following gentlemen had been elected as Officers and Council for 1893:—President, Mr. Henry J. Elwes, F.L.S.: Treasurer, Mr. Robert McLachlan, F.R.S.; Secretaries, Mr. Herbert Goss, F.L.S., and the Rev. Canon Fowler, M.A., F.L.S.; Librarian, Mr. George C. Champion, F.Z.S.; and as other Members of the Council, Mr. C. G. Barrett, Mr. Charles J. Gahan, M.A., Mr. F. DuCane Godman, F.R.S., Mr. Frederick Merrifield, Mr. Osbert Salvin, M.A., F.R.S., Dr. David Sharp, M.A., F.R.S., Colonel Charles Swinhoe, M.A., F.L.S., and Mr. George H. Verrall. The President then delivered an Address, which, though containing reference to the Society's internal affairs and an allusion to the successful resistance made by naturalists and others to the War Office scheme for establishing a rifle range in the New Forest, consisted for the most part of full obituary notices of Fellows of the Society who had died during the year, special mention being made of Mr. Henry W. Bates, F.R.S., Professor Hermann, C. C. Burmeister, M.D., Dr. Carl A. Dohrn, Mr. H. Berkeley-James, Mr. J. T. Harris, Sir Richard Owen, K.C.B., F.R.S., Mr. Henry T. Stainton, F.R.S., Mr. Howard Vaughan, and Professor J. O. Westwood, M.A., the Hon. Life President. A vote of thanks to the President having been proposed by Lord Walsingham, F.R.S., and seconded by Mr. J. H. Leech, Mr. Godman, replied. Dr. D. Sharp, F.R.S., then proposed a vote of thanks to the Secretaries, Treasurer and Librarian, which was seconded by Mr. W. H. B. Fletcher, Mr. McLachlan, Mr. Goss, and Canon Fowler then severally replied, and the proceedings terminated. —H. Goss and W. W. Fowler, *Secretaries.*

CITY OF LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY.

Tuesday January 3rd, 1893.—Exhibits:—Mr. Clark, two varieties of *Argynnis selene*, one with the upperside dusted with black scales, the other having the black markings coalescing in a central band, a specimen of *A. euphrosyne* with a pale (xanthic) hind wing, and a small and darkly suffused specimen of *Saturnia carpini*. Mr. Bloomfield, a bred series of *Papilio machaon*, one specimen having a red inner margin to the black band on the hind wings; a series of *Colias edusa*, including a female without the yellow spots in the marginal band; also spring and summer specimens of *Selenia illunaria*. Mr. Battley, a variable series of the undersides of *Epinephele hyperanthus* from Caterham and North Devon. He pointed out that the lower spot on the upper wing was frequently absent, and that in no case were the two sides exactly similar in markings. Mr. Jackson, *Stauropus fagi*, *Macroglossa bombyliformis*, *Cymatophora ridens*, *Acronycta alni* and *Ephyra omicronaria* all taken in the New Forest last May, also a specimen of *Polyommatus phlæas* from Walthamstow, without the band on the hind wings, but with red streaks on the wing rays. Mr. Tremayne, a number of specimens from the New Forest, including *Argynnis paphia* var. *valezina*, *Stauropus fagi*, and *Nola strigula*, the latter being taken on sugar. Capt. Thompson, a small dark specimen of *Tephrosia biundularia* from Stafford, *Ptilodonta palpina* from Halifax, and *Hepialus sylvinus* from Hampstead Heath. Mr. Nicholson, *Cheimatobia boreata*, and some strongly marked specimens of *C. brumata* from West Wickham; also *Leucania phragmitidis*, taken some years ago near Lea Bridge. Mr. Gates, *Antithesia salicana*, *Stigmonota internana*, *Peronea permutana*, *Homœosoma sinuella*, *Gelechia hermannella*, &c, all from Shepherds' Bush. Mr. Sykes, *Pœcilocampa populi* and *Petasia cassinea*, taken on street lamps at Enfield. Coleoptera. Mr. Heasler, *Myrmecoxenus vaporarirorum*, *Hister bimaculatus* and *Bruchus pisi*, the latter being bred from peas. Mr. Rosevear, two large beetles from Travencore, together with some of their eggs. Mr. Soul, a spiders nest from the Cape. This was larger than a cricket ball, composed of leaves and silk, and suspended from a twig by several threads. He also exhibited the spur of a cock 13 years old.

Tuesday 17th, 1893.—Exhibits:—Mr. Battley, bred specimens of *Argynnis paphia* and pupa of same, found in the New Forest attached to the underside of a honeysuckle stalk. He remarked that he had observed more than a dozen larvæ of this species basking in the sun on a piece of moss, which they closely resembled in colour. Mr. Simes, preserved larvæ of *Satyrus semele* from Sussex. He stated that these larvæ hid under leaves by day, and only became active in the evening, when they ascended the grass on which they fed. Mr. Clark, *Stauropus fagi* from Epping and New Forest, also empty cocoons of the same. Mr. Bayne, *Stauropus fagi* from Epping Forest, including the black variety, also pupæ, cocoons, parasites and coloured drawings of the larvæ. Mr. Riches, a series of *Cidaria dotata* bred from larvæ found on red currant. He remarked that this species only passes a short time in the pupa, several of his specimens having emerged before some of the others pupated. Capt. Thompson, a specimen of *Dasypolia templi*, taken at rest on a wall near Halifax on 19th November. Mr. Sykes, a specimen of *Sirex gigas* taken at Enfield in July, 1887. Mr. Bayne, then read his paper on "*Stauropus fagi*" in which he described the preparatory stages of the insect, and gave his experience in breeding it from the egg. He also stated that notwithstanding the scarcity of small trees in Monks Wood, nearly half the imagines were found on small stems, including a large percentage of the dark variety. A discussion ensued, and a vote of thanks to Mr. Bayne, concluded the proceedings.

THE SOUTH LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY.

November 25th, 1892.—C. G. Barrett, Esq. F.E.S., President, in the chair. Mr. J. Jeuner Weir, exhibited *Pyrameis cardui*, which he had received from Lurimer County, Colorado, captured at an elevation of upwards of 7,000 feet, and remarked thereon. Mr. R. Adlin, *Zygæna filipendulæ*, L., showing gradations of colour intermediate between the red and yellow forms; also *Peronea rufana*, and *P. hastiana*, Mr. F. W. Frohawk, a bred series of *Smerinthus tiliæ*, showing variation in extent of markings and depth and hue of colour, one specimen being very red. Mr. R. South. malformed specimens of Lepidoptera, including *Papilio machaon*, *Melitæa athalia*, and *Lycæna adonis*, *Lycæna icarus*, *Tortrix piceana*, and made some observations thereon. Mr. Dennis, a very dark form of *Vanessa cardui* and examples of *Colias edusa*, bred from ova obtained in August. Mr. H. Williams, pupæ of *Colias hyale*, reared by him from ova obtains from a captured female. Mr. Tugwell, *Dianthœcia barrettii*. Mr. Barrett, on behalf of Mr. Collins, of Warrington, exhibited dark varieties of *Acronycta leporina*.

December 8th, 1892.—The President in the chair. Mr. F. W. Frohawk, on behalf of Mr. Merrifield, exhibited specimens of *Vanessa atalanta*, the pupæ having been subjected to various temperatures. Some of the pupæ which were subjected to a temperature of 45° to 32° for 47 days and then from 6 to 24 days to a tenperature of 90° to 54° produced some aberrations, the cold having a tendency to break up the bands, to increase the depth of ground colour and to produce a suffusion of white scales. Mr. Farren, showed four aberrations of *Papilis machaon*, a series of very dark brown, and black varieties of *Chauliodus chærophyllellus*, Goze ., and some Nepticulæ pinned with very fine silver pins and put on strips of soft pith. Mr. South, a specimen of *Eriogaster lanestris*, ♀., with ova showing between the segments of the abdomen, Mr. South and Mr. Barrett, were of opinion that the ova were showing through a transparent membrane, but Mr. Jenner Weir, said the ova appeared to have ruptured the integument; Mr. Hawes, the two emergences of *Pieris napi*, both bred from the same female, also example of the same species, the larvæ having been fed on different foodplants and made some observations as to the effects produced. Mr. Tutt. examples of several species of the genus *Taniocampa*, which Dr. Chapmon, had extracted from the pnpa cases in some cases as early as the 25th of October. Some remarks were made as to the full development of these and other species which hibernated as pupa. Mr. Frohawk, exhibited larvæ of *Hesperia paniscus*, Mr. Elisha, two drawers one of Coleophora and the other of Nepticula with cases, labelled to show the times of appearance, foodplant of the larva and locality. Mr. Elisha, stated that he had adopted this system for the whole of his collection of the Tineina, Mr. R. Adhin, on behalf of Mr. Austin, some very fine examples of *C. edusa*, three varieties of *Lycæna adonis*, all taken at Folkestone, during his summer holidays.

December 22nd, 1893.—President in the chair. Mr. W. H. B. Fletcher, exhibited a long series of *Psilura monacha*, and said he obtained ova from a normal female in 1887, from Mr. Tate, and by careful selection had at last obtained a dark race and had no doubt that in time perfectly black specimens would be produced. The specimsns bred in 1888 were nearly all normal. The darkest parents selected from this brood produced banded specimens the following year, and those bred in 1890, were suffused on the outer margin, whilst those of 1891 and 1892 were mostly black. Mr. Tugwell, said the black forms occur at Wickham, he having taking it there, showing that the black specimens occur near London. Mr. Adkin, pointed out the difference between the genuine British specimens and those from the Continent, the latter had a smoky brown ground colour, approching *O. dispar* whilst the British specimens in many cases were really black. Mr. South, called attention to specimens he exhibited earlier in the year, which he received from Windsor, and stated that the buff colour of those he produced was caused by the ammonia jar, but those killed with cyanide retained the proper colour. Mr. South, also supported Mr. Fletcher's view as to the production of black specimens at will, and said that also a light form could be obtained by eliminating all the dark ones, and the dark race could be produced by eliminating the light forms. The discussion was continued by Messrs Frohawk, and Fenn. Mr. Adkin, exhibited *Tæniocampa gothica* and var *gothicina*, and contributed notes, and Messrs Barrett and Tutt, also made remarks upon this exhibit, Mr. H. Williams, two males of *Colias hyale*, bred this season from ova obtained from a female captured at Northfleet last September, Mr. Williams, was congratulated upon his success, Mr. Barrett remarked that they were the only specimens he knew of that had been bred in this country.

F. W. Barker, and A. Short, *Hon. Secs.*,

NORTH LONDON NATURAL HISTORY SOCIETY.

This enterprising Society (which was founded in February, 1892, to meet certain local requirements) held its first annual exhibition on January 7 at the Lecture Hall, North-East London Institute. Although but a young society, it possesses a roll of upwards of forty members, some twenty-three meetings have taken place, and several excursions made to localities interesting to naturalists. A list of local fauna and flora is also in progress, besides a collection of Lepidoptera. There was a good attendance of visitors at the Exhibition and much interest was evinced in the various exhibits. Mr F. J. Hanbury's fine botanical specimens showed to great advantage; as also Mr. J. A. Clark's cases of birds and collection of eggs Mr. J. Wheeler, showed fossils and shells, also a mounted Chameleon, captured in Clapton, August 1892; and some British Coleoptera. Mr. G. A. Lewcock, and Mr. M. Culpin, also exhibited the latter order. British Lepidoptera was well represented by some twenty members, the most noticeable being the well-filled drawers of Messrs. Battley, Prout, Nicholson, and Hodges. Mr. Rose's exhibit included many beautiful Papilionidæ collected by him in British Columbia during last summer. Mr. R. M. Watson, contributed living larvæ, pupæ, and imagines of Neuroptera. There were many other interesting exhibits, and the event proved altogether a decided success. The musical arrangements were under the able direction of Mr. L. B. Prout, who gave an admirable rendering of the Overture to "Fra Diavolo." It may be as well to mention that the Hon. Secretary of the Society is Mr. L. J. TREMAYNE, 4 Lanark Villas, Maida Vale, W.

LANCASHIRE AND CHESHIRE ENTOMOLOGICAL SOCIETY.

Monday January 9th, 1892.—The annual meeting of the Lancashire and Cheshire Entomological Society was held in the classroom of the free Public Library, William Brown-Street, Liverpool. Mr. S. J. Capper, F.L.S., F.E.S. (president), occupied the chair, and there was a good attendance. A number of interesting exhibits were laid on the table for inspection.—The first business was the election of officers for the ensuing year. Mr. Capper was for the 17th time re-elected to the position of president; Mr. W. E. Sharp was appointed vice-president; Mr. F. N. Pierce, F.E.S., honorary secretary and treasurer; and Mr. C. H. H. Walker, librarian. Mr. Walker, on behalf of the members of the society, said it was his pleasing duty to ask Mr. Capper to accept a handsome gold-mounted silver case containing a pair of gold entomological forceps. (Applause.) The society congratulated itself upon having again secured Mr. Capper as its president. During the 16 years he had presided over them he had sought only the advancement of the society, and had encouraged the members to take an interest in their studies. (Hear, hear.) They therefore desired to inaugurate that session by doing something more than merely thanking Mr. Capper for his past services; and they offered this slight token of regard, knowing that it would occupy an honoured place amongst his valuable collection. (Applause,) Mr. Capper, in acknowledging the gift, said that he thoroughly appreciated the kindness of the members, and would in future, as in the past, do all he could to benefit the society. (Applause.) Before proceeding to deliver his presidential address, he referred to the death of Professor Westwood. The President exhibited a melanic variety of *Timandra amataria*, the specimen was unicolorous, composed of soft olive green scales. Mr. Gregson, a collection of Autographs of Naturalists, Artists, and Authors, including nearly all the entomologists of the last 50 years. Mr. Walker, a drawer of varieties of North American *Vanessa antiopa*, probably the finest lot of varieties of this species extant. Mr. Collins, *Stauropus fagi* from Reading. Mr. Mosley, set of Educational cases of Natural History to be used as prizes at schools. Mr.

Newstead, a specimen of *Vanessa antiopa* captured in Cheshire in 1877 by Mr. Leather, of Vale Royal.—F. N. Pierce, *Hon. Sec.*, 143, Smithdown Lane, Liverpool.

GUERNSEY SOCIETY OF NATURAL SCIENCE AND LOCAL RESEARCH.

December 14th, 1892.—The usual monthly meeting of the above Society was held on Wednesday last at the Guille-Allès Library, Mr. E. D. Marquand, President, in the Chair. The Attendance of members was rather small. Mr. Cecil Carey, was unanimously elected member. Mr. Derrick read a letter from Capt. Wilkins containing some notes on the recent appearance and capture of various birds in the island. Mr. Luff read from *The Field Club* a paper by R. Lawton Robert, M.D., on "The insusceptibility of some individuals to the stings of Wasps, Bees, and Nettles." This paper was the more interesting as the particular cases therein referred to were noticed in Jersey and in Herm. It is, at least, curious and unusual that a person should be stung on the head, neck, arms and hands by scores of wasps and yet feel no pain ; also that children should play and romp unharmed in a luxuriant bed of nettles, as though they were among so much new-mown hay. Mr, Z. Robert then entertained the meeting with a varied collection of Guernsey proverbial sayings, and scraps of local folk-lore which are at once interesting and valuable, as much of this material is fast passing away as the older generation dies out. An excellent paper written for this Society, by Mr. Howell, of Jersey, on "Marine Worms of the Channel Islands," was then read by Mr. Marquand, who had prepared enlarged drawings of two of the creatures referred to. This paper, which was the result of much close observation on the part of the writer, dealt chiefly with that strange and unaccountable habit among certain lower forms of animal life, which is known as "Commensalism." The paper was most interesting and was much enjoyed.

January 11th, 1893.—The monthly meeting of the above Society was held at the Guille-Allès Library last Wednesday evening, Mr. E. D. Marquand, president, in the chair. Mr. Edward B. Marquand, brother of the president, was proposed as a member for election at the next meeting. Mr. Derrick and other members drew attention to a curious deposit of limpet shells, which has been found at a depth about 5ft., while digging some foundations near Fort George. The shells rest upon undisturbed rock, and the earth above them is free from rubbish and extraneous matter. It is difficult to decide how these shells got into their present position. Several suggestions were offered. Mr. Marquand, the president, then read his promised paper on "Holly and Mistletoe," treating his subject in a pleasant and popular manner, and and referring to the appropriateness of the theme, just at this Christmas and New Year's season. The paper gave rise to an interesting conversation in which a number of members took part. Mr. Marquand afterwards brought forward a valuable suggestion for including in the Society's *Transactions*, short biographies of Guernsey naturalists, botanists, antiquaries, &c., together with lists of their published works if any ; the titles of any articles contributed by them to scientific or other periodicals ; and any other similar information. Mr. Sharp, Mr. Luff, Mr. Derrick, Mr. Pitts, Mr. De La Mare, and others spoke in favour of the project, which was referred to a sub-committee for further consideration and arrangement.—W. Sharp, *Hon. Sec.*

Review.

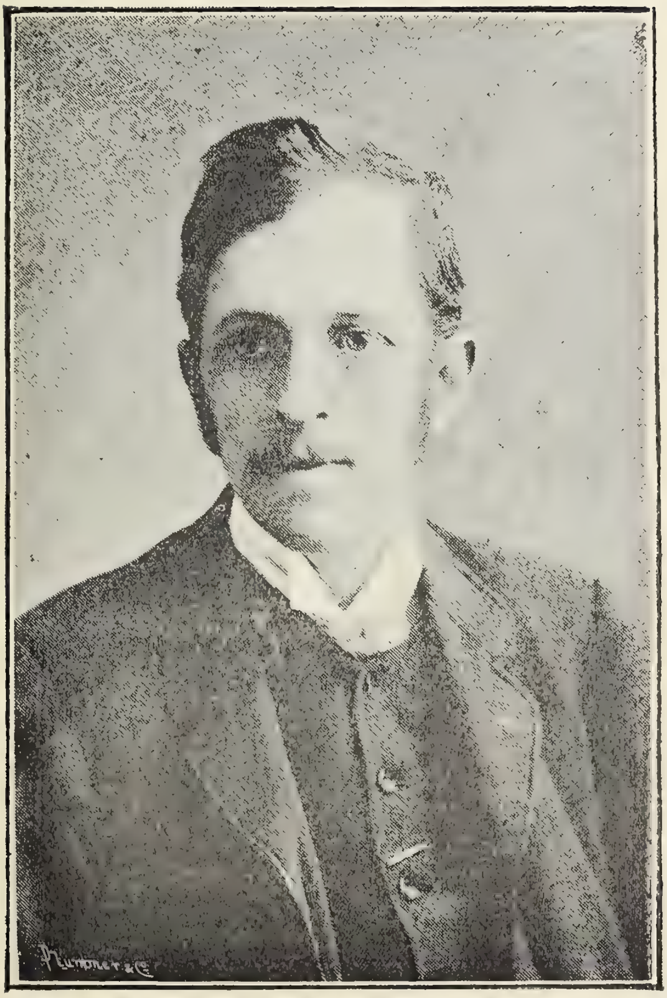
Transactions of the City of London Entomological and Natural History Society for 1892.—We believe this is the first attempt made by this Society to present its members with a lengthy report of the year's proceedings, and we have great pleasure in observing how creditable the production is to them. It commences with the Annual Pocket Box Exhibition, of December 17th 1891, and gives a report of the whole of the proceedings, somewhat similar to that appearing month by month in our columns, with this exception that a number of the papers read at the meetings are given more or less *in extenso*. Among them we find papers by Mr. Quail, on "Preserving Larvæ"; by Mr. Tutt on "The Pterophorina," with which a valuable table of species is given as it appeared in our pages; on "Dragon Flies," by Mr. Milton (published at length in the "British Naturalist," Vol. 11, p. 37); "The Lepidoptera of Epping Forest" by Mr. Payne; "The Genus Hepialus" by the Editor of the "British Naturalist;" "The British Coccinellidæ" by our Assistant-Editor, Mr. Lewcock; a second by Mr. Tutt on his work at Wicken Fen, a somewhat similar paper to that by Mr. Porritt on the same subject which appeared in our pages (Vol. II., p. 1.) and others. We congratulate the officers on the great advance they have made, and feel sure it will gain for them a considerable accession of members.

NATURALISTS OF THE DAY.

XIII.—THEODORE D. A. COCKERELL,

F.Z.S., F.E.S., &c.

The subject of the present sketch was born at Norwood, in Surrey, in 1866. He is therefore far below the usual age at which naturalists are known to the general public. When only 13, he resided for a few months in Madeira, and paid some attention to the entomology of that island. He subsequently became interested in Mollusca during his residence at Margate. He was intended for the medical profession, but his health broke down and he did not finish his course. In 1887 he went to Colorado to recruit, and worked there for a while as an agricultural labourer, and afterwards as a teacher. During his residence there, he became Secretary of the Colorado Biological Institution. He returned to England in 1890, and in the following year was appointed Curator of the Museum of the Institute of Jamaica, where he now resides. His first published contributions to science were in "Natural History Notes," 1882, and his papers in various Natural History publications since then have been numerous and many of them important, including "List of Mollusca of Kent, Surrey, and Middlesex," "Zoologist," 1885; "Variation and Abnormal Development of the Mollusca;" "Science Gossip," 1885, &c.; "Notes on Slugs;" "Annals and Magazine Natural History," 1890-91;



T. D. A. COCKERELL,

F.Z.S., F.E.S., ETC.

NATURAL HISTORY

"Geographical Distribution of Slugs;" "Proc. Zool. Soc," 1891; "Preliminary list of the Insect Fauna of Middlesex"; "Entomologist," 1889, &c.; "'British Naturalist' Catalogue of Mollusca," 1890; articles on "Snail," "Slug" ("Chamber's Encyclopædia," new ed., 1892); and various papers in "Nature," "Journal of Conchology," "British Naturalist," "Nautilus," "Canadian Entomologist," "Entomologist," "Entomological News," Conchologist," "Naturalist," "Journal of Botany," &c., &c., &c. If his life be spared, great things may be expected from him in the future.

Obituary.

PROFESSOR J. O. WESTWOOD.

Another of the older Entomologists, John Obadiah Westwood, Hope, Professor of Zoology, has passed away. Born at Sheffield, on 22nd December, 1805, he had completed his 87th year, and had been a writer on Entomological and other subjects for more than 65 years, his first note being published in 1827. He was educated first at a Friends' School, at Sheffield, and even there he evinced a strong taste for Natural History and a gift for drawing from nature, in which he trained himself to a wonderful pitch of skill. His family subsequently removed to Lichfield, where they lived for a time in Parliament Cottage, once the residence of Dr. Johnson. The Cathedral here had great attractions for him, and no doubt helped to lay the foundations of his taste for ecclesiastical art. His next remove was to London where he was articled to a solicitor and afterwards was a partner in the firm, but his heart was not there and he became more and more absorbed in Entomological studies and in the paleography of art. When the Entomological Society was founded in 1833 he was one of the original members, and became the first Secretary, subseqnently he was elected Honorary Life President. He was made an honorary member of the Entomological Society of Paris in succession to Humboldt. His Entomological writings are legion; perhaps the best known being his "Introduction to the Modern Classification of Insects," (1839-40); "British Butterflies and their Transformations," (1843-5). In 1858 the late Mr. Hope purchased Mr. Westwood's very valuable Entomological Collections, and presented them, with his own extensive collections, to the University of Oxford, making him first Keeper and then in 1861, Hope Professor. The University made him M.A., and in 1880 he was elected an Honorary Fellow of Magdalen College.

This is not the place to refer at length to his Archæological and Palæographical writings. His "Palæographiæ Sacra Pictoria," "Facsimiles of the Minatures and Ornaments of the Anglo-Saxon and

Irish MSS," "Lapidarium Walliæ," "Book of Kells," and other works, are monuments of his extraordinary knowledge and ability. His acquaintance with ivories and inscribed stones was great, and he was employed to make the catalogues of ivories at South Kensington. He received a gold medal from the Royal Society, was a Fellow of the Linnæan Society from 1829, a Fellow of the Society of Antiquaries, and an honorary or corresponding member of many other learned bodies both at home and abroad.

He was married in 1839 to Miss Richardson, and was buried on Friday, January 6th, in the same grave, at St. Sepulchre's Cemetery, Oxford.

General Notes.

BIRD NOTES FROM LONDON.—About Christmas time, when the cold weather began, vast quantities of gulls appeared on the Thames above Blackfriars Bridge, and the thaw does not seem to have appreciably diminished their numbers, for I saw some hundreds yesterday morning close to Westminster Bridge. It is to be hoped that some at least of the birds will get accustomed to their present surroundings, and spend the year, with the exception of the breeding season, on what is evidently such a good feeding ground. I do not know much about the different species of gulls, but I believe the flocks consist of common gulls, herring gulls, and kittiwakes, with a few black-headed gulls.—About a fortnight ago, I several times heard a magpie in St. James's Park, and saw it once in the dusk of the evening. I do not know whether it was an escaped tame bird, or a wild one which had strayed into London. It seemed to be able to fly quite well.—The geese on the ornamental water at St. James's Park appear to have a strong objection to frozen ground. Before Christmas, I always saw a lot of them at the Horse Guards' end of the water strutting about or pruning their feathers when I walked by, about 10.45 in the morning; but while the ground was hard frozen they were always on the ice at that time. When the ground got soft again, which it did long before the ice got too thin to bear them, many of them left the ice again for the grass.—F. E. PRESCOTT-DECIE, 14, Kensington Gate, London, W., *January 22nd, 1893.*

BITTERN IN HEREFORDSHIRE.—One of these birds, a male, in very good plumage, was shot the end of last month near a little brook on the eastern side of the county. The cold was very severe here at the time. It is the first record we have of a bittern having been seen anywhere in this neighbourhood.—NORAH PRESCOTT-DECIE, Bockleton Court, Tenbury, *January 30th.*

How are Young Spiders Fed?—In my rambles for botanical specimens in the last three years, many new and curious things have been thrust upon my attention in the insect world, and these I have recorded for future use. One fact in particular struck my attention, and I herewith submit it to the readers of *Science*, partly to record the fact, and partly to ask if any other readers of your excellent periodical have ever observed a similar fact. We have been taught by the best works on spiders that the young of spiders derive their food mostly from the atmosphere. The "Encylopœdia Britannica" confirms this view. On the 19th day of June, 1891, I discovered in a ploughed field an enormous spider of the *Lycosidæ* species, which was 1½ inches long. She presented a very curious appearance, being covered with scores of tiny spiders from one end of her body to the other. When I touched her with a weed-stem, the young spiders scampered off at a lively rate, only to return when left to themselves. The spinnarets and abdomen of the mother spider were greatly distended Suddenly there was a copious flow of white liquid which the young greedily devoured. Examining the fluid under my microscope, I was fully convinced that this was veritible milk, and that this spider, at least, nursed its young, instead of bringing them up on atmospheric moisture. I should be glad to know if any reader of *Science* has ever observed a similer occurrence.—John Sanborn, Naples, N.Y.

[The above is copied from "Science" (New York) 16th December, 1892, in hope that some of our British observers of Spider life may throw some light on the matter.—Ed. B.N.]

Epeira quadrata.—Can you give me an idea of the nest (structure, character of material, &c.), of *Epeira quadrata*?—C. E. Stott, Bolton.

The Synonymy of Polyommatus Phlæas.—In the "British Naturalist," Vol. II., p. 242, you state, on the authority of Mr. Dale, that "*Phlœas* was first named by Linnæus in the 'Fauna Suecicæ,' 1746." This rather startled me, as I had satisfied myself only a fortnight ago that the 1746 edition did not contain trivial names. To make sure, I have referred to the volume again, and find I was right. That edition uses what (although a hibernianism) I will call the pre-Linnæan method of indicating insects, viz., the generic name with a diagnosis. Linnæus first used trivial names in the 10th ed. of "Syst. Nat," then in the 1761 Ed. of "Fauna Suecicæ." I imagine it is in this latter work that *Phlœas* first received its appellation. Staudinger gives Fn. Su., 285, as its origin. This must be the 1761 Ed., as p. 285 of the 1746 Ed. does not deal with Lepidoptera at all.—F. J. Buckell, 32, Canonbury Square, London, N.

Dr. Buckell is right about the "Fauna Suecicæ." Linnæus apparently, in Ed. X. of the "Syst. Nat.," confounded two species under *Virgaurea*. However, in Ed. XII., both *Phlœas* and *Virgaurea* appear, the reference to Ray being apportioned to *Phlæas*. It would therefore be hardly correct to say *Virgaurea* is the oldest name of *Phlæas*. It would be equally or even more correct to say that *Hyale*, Linn, is the oldest name of *Edusa*.—C. W. DALE, Glanvilles Wooton.

The error in the article named was mine, not Mr. Dale's, who gave me the same references as Dr. Buckell does; but I referred to Staudinger before I used it, and finding there "Fn. Su. 285" as the first authority for the name, I foolishly took Staudinger's reference instead of Dale's. The reference in Staudinger should have been "Fn. Su. II., 285," which would have made all the difference. Those interested in synonymy had better correct their copies of Staudinger accordingly.—JOHN E. ROBSON, Hartlepool.

RAVAGES OF ANOBIUM TESSELATUM.—The Rev. J. E. G. Farmer, Vicar of Arundel, is calling attention to the "deplorable" state of the roof of the old historic church, at Arundel, which is honeycombed by "the worm known as *Anobium tesselatum*," to such an extent as to be positively unsafe. The church which is one of the finest in Sussex, was erected in 1380, but was restored at great cost some 16 years ago, and I presume the damage referred to must have been done during that time. I myself saw a floor, a few weeks ago, in a dwelling house in Hartlepool, that was so completely destroyed by this beetle that it could be crumbled away in the fingers.—JOHN E. ROBSON.

CONCHOLOGICAL SOCIETY FOR LONDON.—An attempt is to be made to form a Conchological Society, with headquarters in London. It is proposed to hold monthy meetings from November to June, for exhibition of specimens, and discussion of papers, such papers to be published and distributed to the members. A subscription of 10/6, without entrance fees at any rate at first is estimated to be sufficient to cover expenses. A number of well-known gentlemen have already expressed their approval and willingness to join the Society, but a few more members are wanted. Will any who are disposed to assist in the matter communicate with Mr. E. R. SYKES, 13, Doughty st., W.C.

PRIONUS CORIARIUS:—A short time ago, one of my nephews sent me a specimen of this fine Longicorn, which he had taken at a street lamp at Streatham Hill, Surrey, last autumn. Is it not rather an unusual occurrence to take this insect at light?—A. FORD, St Leonards-on-Sea.

COLIAS EDUSA AT VENTOR.—The last Clouded Yellow I had the pleasure of seeing last year was at Ventnor, in the Isle of Wight, where I observed it on the wing on 29th October.—C. W. DALE, Sherborne, Dorset.

BOMBYX RUBI.—I saw larvæ of this species sunning themselves on the 29th January. It is a sign of a very mild winter to find them out so early.—JOHN E. ROBSON, Hartlepool.

3 FEB. 93
BRITISH MUSEUM

EXCHANGE.

Exchange.—Wanted—Magic Lantern Slides of Insects. Any order, and either eggs, larvæ, pupæ, perfect insects, or dissections desired. Will give Lepidoptera in return, or Cash. —John E. Robson, Hartlepool.

Duplicates.—Lucernea, Dahlii, Adusta, Gemina, H. urticæ*, Carpini, Fuliginosa*, Solidaginis, C. nigrum, Rurea, var. Combusta, Basilinea, Suspecta, Lucipara. Well set and in black pins. Desiderata very numerous.—G. E. Hartley, 34, Castle Street, Aberdeen.

Duplicates.—Pudorina, Umbrosa. Immutata, Statices, A. Cratægi,* Anachoreta,* etc. Desiderata—Rufina, Lota, Spadicea, Fimbria, Croceago, Citrago, Dahlii, Haworthii, Saucia, Subtusa, Oxyacanthæ (dark), Herbida, Rhizolitha, Myrtilli, Parthenias, Verbascalis, etc.—J. W. Tutt, Westcombe Hill, S.E.

Exchange—Marine Shells from New Zealand offered for foreign land and fresh-water shells, Microscopic slides illustrating useful or noxious insects, or botanical or entomological lantern slides.—W. A. Gain, Tuxford Newark.

Exchange (Duplicates)—E. minutata var. Knautiata Gregson, and many common species. Desiduata, numerous. C. E. Stott, Manchester Road, Bolton-le-Moors.

Exchange (Duplicates)—Viretata, lobulata, E. edusa, solidaginis, suffusa testacea, loniceræ, citraria, pyramidea, cardui, selene, euphrosyne all on black pins. Desiderata, very numerous. —P. W. Abbott, Four Oaks, near Birmingham.

Duplicates.—Fine Blandina, Davus (Scotch), Euphrosyne, V. urticæ (Scotch), Mendica, Fulginosa and borealis, Loniceræ, Capsincota, Myricæ, Menyanthidis, Adusta, Rectilinea, H. urticæ, Duplaris (dark). Rurea (vars.) Polyodon (dark), Plantaginis, Conflua, Plecta, Wavaria, Maculata, Atomaria, Pinetaria, Lobulata, Suffumata, Corylata (light), Testata, Populata (vars), Fumata, Atomalis, Hastiana, Ministrana, Cosmophorana, Ochracella.—T. Maddison, South Bailey, Durham.

Duplicates.—Ægon, Blandina, Davus, Tiliæ, Loniceræ, Filipendulæ, Petasitis, Conigera, Tritici, Carpophaga, Polyodon (black vars.) Festiva—vars. Biundularia, Zonaria, Silaceata, Ulmata, Basilinea, Umbrosa, Gothica, Rubricosa, Gracilis, Albicolon, Rurea, and vars. Testacea (dark and light), Micacea, V. aureum, &c., &c. Desiderata, very many common species to enlarge series.—John E. Robson, Hartlepool.

Exchange (Duplicates)—Velleda, Mundana, Fulva, Nictitans, Lithoxylea, Rurea, Graminis, Oculea, Fasciuncula, Literosa, Furuncula, Arcuosa, Macilenta, Rufina, Chi, Protea, Candidata, Aversata, Vulgata, Olivata, Rubiginata, Ocellata, Badiata, Immanata, Fulvata, Lutealis, Prunalis, Decrepitalis (2 or 3, fair), Cembræ, Dubitalis, Murana, Octomaculana, Bertrami, Trigonodactylus, Caudana, Subjectana, Rubiella, Albulata, Menthastri, Basilinea, Biset ta, and Aprilina.—A. Adie Dalglish, 21, Princess Street, Pollockshiels, Glasgow.

Duplicates.—Suspecta, Thalassina, Plecta, Pisi, Pudorina, Sparsata, Loniceræ, Basilinea: Rurea and vars, Brunnea, Gemina, Augur, Strigilis, Segetum, Trapezina, Oleracea, Xanthographa, Comes, Senex (few), Ulmata, Festiva, and Blomeri. Desiderata—Numerous, and Birds' Eggs.—E. G. Potter, 19, Price Street, York.

Birds' Eggs for Exchange.—Great Plovers, Razorbills, Guillemots, Jackdaws, Magpies (variable series or clutches), Sand Martins, Com. Terns, Puffins, Blackcaps, Partridges, Lapwings, Moor Hens, and one Golden Plover.—Wanted Cuckoo's eggs with clutches, and many other species.—E. G. Potter, 19, Price Street, York.

MEETINGS OF SOCIETIES.

CITY OF LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY Meets on the First and Third *Tuesdays* in each month, at the London Institution Finsbury Circus, E.C., from 7.30 to 9.30 p.m. The following programme has been arranged :—Feb. 7th, "The genus Xanthia," Mr. J. W. Tutt; Feb. 21st, "Is melanism in Lepidoptera caused by moisture?" Mr. J. E. Robson; Mar. 7th, "Conchology," Mr. J. B. Rosevear; Mar. 21st, "Specific nomenclature, present, past, and future," Dr. F. J. Buckell.—A. U. Battley and J. A. Simes, *Hon. Secs.*

ENTOMOLOGICAL SOCIETY OF LONDON, 11, Chandos Street, Cavendish Square, W. Wednesday, February 8th and 22nd, 1893, at 7 o'clock in the evening.

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TO CORRESPONDENTS.

A Portrait of G. A. Clark, President of the City of London Entomological and Natural History Society, will appear in the next part.

This part contains a portrait of T. D. A. Cockerell, of Jamaica, and four extra pages.

Arrangements are now completed for continuing the Molluscan Section. W. A. Gain, Esq., of Tuxford, Newark, has kindly undertaken the Land and Fresh Water Mollusca, and Brocton Tomlin, Esq., of The Green, Llandaff, will attend to the Marine Section. Communications may be made to either of these gentlemen. All letters requiring a reply by post should contain stamp.

The Section for Coleoptera is conducted by G. A. Lewcock, Esq., , Oxford Road, Islington, to whom also direct communication may be made.

Mr. Lewcock also represents the Magazine in London, and will receive subscriptions, papers and notes for publication, &c., &c.

Subscriptions, exchanges, business correspondence, notes, papers for publication, and all other communications, to be addressed—John E. Robson, Hartlepool.

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WITH A PORTRAIT AND FOUR EXTRA PAGES.

MARCH, 1893 *Part XXVII.*

THE
BRITISH NATURALIST:
AN
ILLUSTRATED MAGAZINE
OF
NATURAL HISTORY,

CONDUCTED BY

JOHN E. ROBSON, F.E.S., Hartlepool,

WITH THE ASSISTANCE IN VARIOUS DEPARTMENTS OF

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EDITED BY WALTER E. COLLINGE,

With the assistance in special departments of Rev. A. H. Cooke, M.A., F.Z.S.; Walter Parstang, M.A.; R. F. Scharff, Ph. D., B.Sc., M.R.I.A.; E. Ruthven Sykes, B.A.

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Frankenstein & Wagner, Leipzig, Germany.

Coleoptera in the Hastings District during 1892.—During this season I devoted a great deal of time to Coleoptera with very fair results. Early in the spring, in flood-refuse near St. Leonards, I took single specimens of *Harpalus rupicola* and *Acidota cruentatus*; a few *Oxytelus clypeonitens*, *Lithocharis propinqua*, *Homalium cæsula*; several *Achenium humile*, *Agathidium marginatum*, *Hyperaspis reppensis*, *Scymnus mulsanti*, *S. frontalis*, &c. On May 13th I paid a visit to Camber, and, among others, took the following:—*Harpalus servus*, 10, in refuse; *Bembidium ephippium*, *B. varium*, and *Pogonus chalceus*, all in profusion on the bank of a pond; a few *P. littoralis* occurred with the latter species. In the banks of the ditches, *Bledius unicornis*, *B. tricornis*, *B. crassicollis*, *Octhebius bicolon*, *O. margipallens*, *O. æratus*, *Heterocerus sericans*, &c., occurred. From the dry carcase of a sheep on the beach, I beat fully 150 *Dermestes undulatus*; a few *Nitidula bipustulata* occurred with it. On the sandhills I found 3 *Sarrotrium clavicorne*, *Saprinus metallicus*, *Tychius meliloti*, and several common species such as *Microzoum* in profusion. In river refuse, *Anthicus humilis*, *A. instabilis*, *A. antherinus*, *Phaleria cadaverina*, *Dromius nigriventris*, &c., occurred. At Guestling, during June and July, the following were among my captures at this locality, the results of some half a dozen visits:—By sweeping, I obtained over 300 *Chrysomela fastuosa* (this species was excessively local, occurring in profusion on on a piece of ground a few yards in circumference, in a marsh, and I did not find a single specimen anywhere else in the district), *Cryptocephalus morœi*, *Lamprosoma concolor*, *Clythra 4-punctata* (4), *Cassida vibex*, *C. obsoleta*, *C. equestris*, *Strangalia 4-fasciata* (6 on umbelliferous plants), *Callidium alni* (1), *Liopus nebulosus* (2), *Campylus linearis*, *Cistela luperus* (1), *Agrilus angustulus*, *Throscus dermestoides*, *Ptilinus pectinicorns*, *Cholva angustata*, *C. tristis*, *Hydnobius strigosus* (2), *Anisotoma ovalis*, *A. nigrita*, *A. dubia*, *A. littura*, *A. badia*, *A. parvula* (all rare), *A. calcarata* (common), *Colon brunneum*, *C. serripes* (1), *Olibrus affinis*, *Choragus shepherdi* (1), *Conipora orbiculata* (1), *Ceuthorhynchus marginatus* (few), *Rhinoncus subfasciatus*, *Tanymecus palliatus* (4), *Mycetoporus longulus*, *Homalium brevicorne* (1), *H. florale* (common), *H. concinnum*, *H. læviusculum*, *Scymnus pygmæus*, *Galeruca calmariensis*, and many others. *Galeruca viburni* I obtained in abundance by beating Guelder Rose bushes in the autumn. On June 28th, I again visited Camber for a day's collecting and was again pretty successful. By sweeping the banks of the ditches I obtained *Malachius viridis* (abundant), *M. marginellus* (1), *Dasytes plumbeus* (2), *Leptura livida* (common), *Hoplia philanthus* (1), *Nacerdes melanura*, *Pria dulcamara*, *Cryptocephalus pusillus*, *Phyllotreta tetrastigma*, *Œdemera lurida* (several), *Phytobius waltoni* (1), &c. By digging in one of the ditches I obtained a few *Stenolophus consputus*, together with many of the species recorded above, which I took on May 13th. Under a "very much defunct" cat on the sandhills, I found *Cercyon littoralis*, *Phaleria*, &c., in great abundgnce. At Bexhill, by sweeping, *Telephorus lateralis*, *T. lituratus*, *Anoplus roboris* (1), *Rhynchites megacephalus* (several), *R. nanus*, *Cryptocephalus fulcratus* (2), *Luperus betulinus* (abundant by beating bushes), &c. By sweeping in some bushes near St. Leonards I obtained a series of the rare *Telephorus translucidus*, a few *T. testaceus*, *Helodes marginata*, *Apteropeda globosa* (1), &c. On some marshes near here, by beating, I obtained a long series of *Malthinus balteatus*, *M. punctatus*, *M. fasciatus*, *Anthonomus pedicularius*, *Helodes livida*, *Cyphon padi*, and odd specimens of *Gracilia minuta*, *Polyopsia Prœusta*, *Scirtes hemisphœricus*, &c. In haystack refuse, on one occasion, I found *Oligota atomaria* in profusion, but although I have visited this stack on several occasions since, have not found a single specimen. At Ecclesbourne, *Phytobius 4-tuberculatus* (1), *Tachys bistriatus* (somewhat common under stones on bank of a reservoir), *Dianous cœrulescens* (under stones in a stream, not uncommon). At Fairlight, I swept a series of *Nanophyes lythri* and *Sitones suturalis* in a marshy place at the foot of the cliffs; I also took a few *Bembidium stephensi* at the same locality. Near Battle, by sweeping, I obtained a specimen of *Mantura obtusata*, a series of *Gymnetron pascuorum*, *Cneorhinus exaratus*, &c. In the autumn, at Guestling, I took a long series of *Thymalus limbatus* under the bark of a decaying beech; in moss, several *Cœnopsis waltoni*, *Tropiphorus carinatus*, *Agathidium nigrinum*, &c. Altogether I met with about 700 species of Coleoptera in the district during the season. The above list represents the less common species obtained.—A. FORD, Claremont House, Upper Tower Road, St. Leonards-on-Sea, *January 21st, 1892.*

THE MOLLUSCA OF NOTTINGHAMSHIRE.

BY W. A. GAIN.

(Continued from Vol. III., p. 5).

Family UNIONIDÆ.

GENUS UNIO, Phil.

Unio tumidus, Phil.—Common in the river Trent, the Idle, and the canals.

Var. *radiata*, Colb.—River Trent.

Var. *ovalis*, Mont.—Found associated with the typical form in the neighbourhood of Nottingham (Lowe).

Unio pictorum, L.—Very plentiful in the Trent, &c.

Var. *radiata*, Moq.—The lake at Highfield House (Lowe). River Trent at Marnham (Musson).

Var *curvirostris*, Norm.—Lake at Highfield House (Lowe). Canal at Wollaton (Musson).

Var. *ponderosus*, Spitzi.—Very numerous in the lake at Ossington some years ago. I cannot say whether it is to be found there or not since the clearing out.

GENUS ANODONTA, Lam.

Anodonta cygnea, L.— Common, and widely distributed in rivers, canals, and ponds throughout the county.

Var. *radiata*, Müll.—River Trent at Marnham (Musson).

Var. *zellensis*, Gmel.—In the lake at Clumber (Rimmer—"Land and Fresh-Water Shells)." I have not found the variety in the lake; but in a large pond below the weir, over which the lake drains, it is, or was, almost the only form found.

Var. *rostrata*, Rosm.—Canal at Beeston (Lowe).

Anodonta anatina, L.—Common in rivers and canals.

Var. *radiata*, Jeff.—River Trent at Marnham.

Family MYTILIDÆ (*Dreissenidæ*).

GENUS, DRIESSENÆ, Van Ben.

Dreissena polymorpha, Pall.—Plentiful in the canals near Nottingham. I have seen the sides of one of the locks closely encrusted with the shells. Also found in the river Soar, and rarely in the Trent.

Class *Gasteropoda*. Order *Pectinobranchiata*.

Family NERITIDÆ.

GENUS NERITINA, Lam.

Neritina fluviatilus, L.—Common in the Trent and other rivers, as well as in canals throughout the county. Probably this species has spread of late years, as Mr. Lowe says "it may be classed amongst our very local shells, being everywhere confined to certain limits," although he enumerates five localities for it.

Family PALUDINIDÆ.

GENUS VIVIPARUS, Montf. (= PALUDINA, Lam.)

Viviparus contectus, Millet.—Mr. J. W. Taylor, in company with Mr. W. D. Roebuck, obtained examples of this species on the northern border of the county. It was afterwards (in 1866) found by Mr. Musson and myself in some numbers, near Bawtry, on the Nottinghamshire side of the Idle, and in ditches connected with that river.

Viviparus viviparus, L.—Common in many parts of the Trent; also found in the Soar; and more or less plentifully in most of the canals.

GENUS BYTHINIA, Gray.

Bythinia tentacula, Jeff.—Generally distributed and plentiful.

Var. *excavata*, Jeff.—In the canal at Worksop. Found plentifully by Mr. Musson and myself.

Mons decollatum, Jeff.—Lenton (Lowe); canal at Worksop (Musson).

Bythinia leachii, Shepp.—Occurs, in company with the last species, in many localities, generally in small numbers. In a ditch communicating with the Trent at Dunham Bridge, I once took this species by hundreds, *B. tentaculata* being comparatively scarce; in the following year the two species were about equally abundant.

Family VALVATIDÆ.

GENUS VALVATA, Müll.

Valvata piscinalis, Müll.—Very widely distributed. I have before me a long list of localities, including rivers, streams, canals, ponds, &c.

Var. *depressa*, C. Pfr.—Nottingham Meadows (Lowe); Clumber Lake, Bawtry, &c. (Musson).

Var. *albina*, Taylor.—" A white variety, Trent Pond, and Clumber" (Musson, in note book).

Valvata cristata, Müll.—Occurs rather sparingly in several localities.

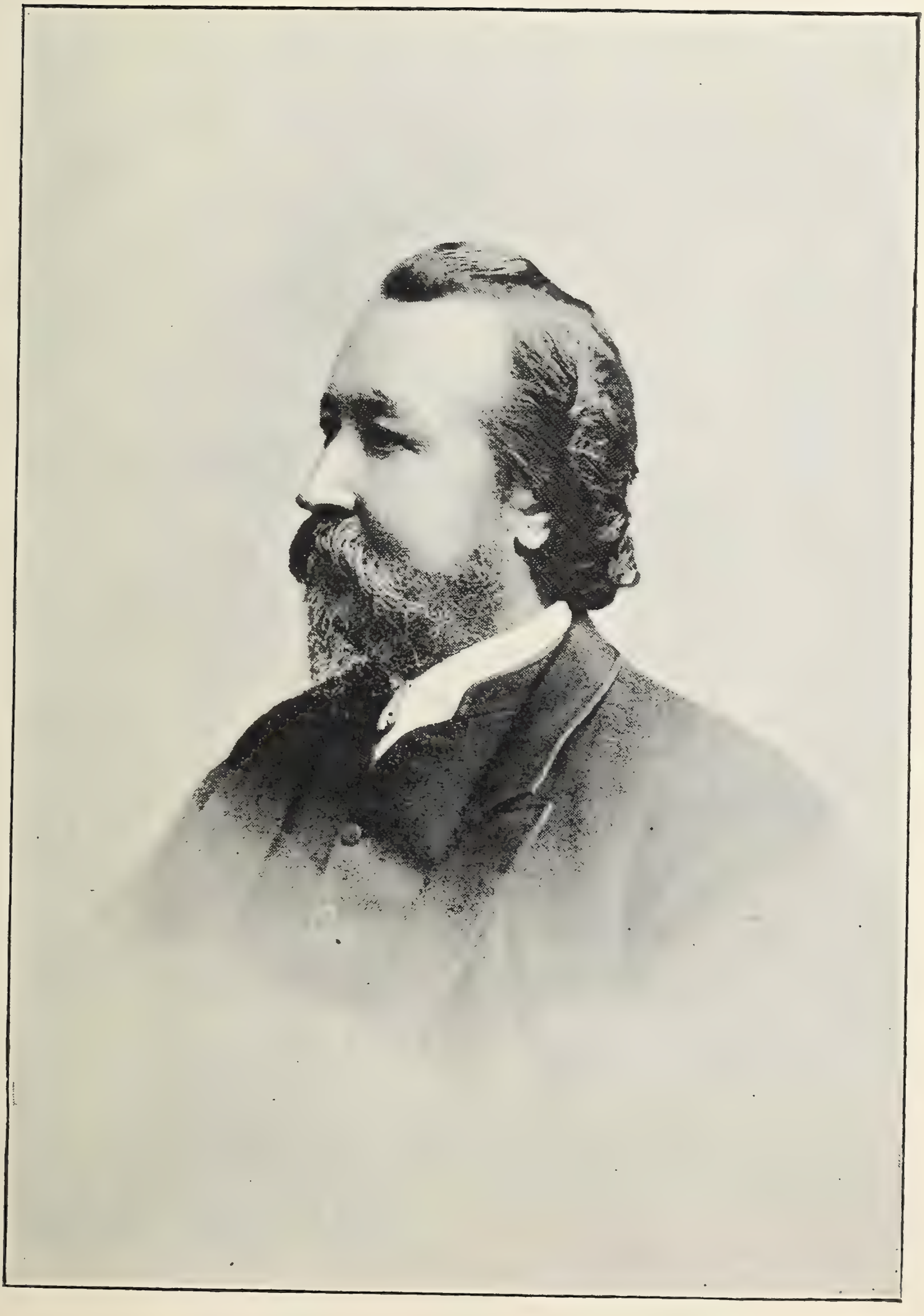
NATURALISTS OF THE DAY.

XIV.—JOHN A. CLARK, F.E.S., M.P.S., L.D.S., ENG.

President of the City of London Entomological and Natural History Society.

The illustration accompanying our present issue is an excellent portrait of Mr. J. A. Clark, of London Fields, Hackney, N., whose efforts in connection with the formation and encouragement of Natural History Societies in the Metropolis fully entitle him to rank as a leading naturalist of the day.

Mr. Clark was born within the sound of Bow Bells, namely at Aldermanbury, in the City of London, in November, 1842, and may thus be considered a true-born Cockney. At that time the dimensions of our great city were comparatively circumscribed, and when the Clark family removed to the suburb of Homerton, the latter locality was essentially a country place, the green fields and shady lanes in the neighbourhood affording good hunting grounds for the entomolo-



JOHN ADOLPHUS CLARK,

F.E.S. M.P.S. L.D.S. Egn.

President of the City of London Entomological and Natural History Society.

BRITISH MUSEUM
NATURAL HISTORY.

gist. It was during his residence at Homerton that Mr. Clark developed a taste for Natural History, Entomology and Ornithology being his favourite studies. At that period *V. atalanta* and *V. urticæ* fairly swarmed in the district, and were frequent visitors to the flowers in the gardens. On one occasion Mr. Clark secured a specimen of *V. polychloros*, and this capture served as an incentive to the young entomologist, who from this time became an ardent student of Lepidoptera.

On the formation of the now flourishing City of London Entomological and Natural History Society, in 1858, Mr. Clark enrolled himself as a member, and ever since has manifested great interest in the Society. On the decease of Mr. Harper, he was elected Treasurer of the Society; and later, in 1889, at the earnest request of the members, accepted the office of President, a position he retains at the present day, having been unanimously re-elected each succeeding year. It will thus be seen that Mr. Clark is held in the highest estimation by the members of the City Society, and deservedly so; and he is seldom absent from their meetings.

Mr. Clark was also one of the founders of the Hackney Microscopical Society, and has recently been the recipient of a testimonial from the members in recognition of his services to that Society. The testimonial—a valuable binocular microscope—bears the following inscription on a brass plate "Presented to J. A. Clark, Esq., M.P.S., L.D.S., Eng., F.E.S., by the members of the Hackney Microscopical and Natural History Society, as a mark of esteem and their appreciation of his services as Treasurer, January 4th, 1893." He is likewise a member of the Entomological Society of London, the South London, and various other Societies

In breeding and rearing Lepidoptera Mr. Clark has been highly successful. He was one of the first to breed *T. subsequa*, the life history of which was published in "Newman's Entomologist." Also the pretty *Hypercallia citrinalis*, Scop. (formerly called *Hypercallia christiernella*, Hb.), the larva having been found by him at Sevenoaks, Kent.

In August, 1889, Mr. Clark read a paper at the City of London Society on the life history of *Phoresdesma smaragdaria*, fully describing the habits of the larva, manner of pupation, and peculiarities of the imago; and at the same time exhibiting sections of the food-plant *(Artemesia maritima)*, showing larvæ of all sizes, cocoons with pupæ enclosed, and a fine series of the perfect insect. In connection with this species it may be interesting to note that imagines have been successfully reared by members of the City Society from larvæ fed on the garden plant Southern Wood or Old Man's Beard.

Among other contributions to entomological literature we notice a paper on *Smerinthus tiliæ*, with coloured plate showing no less than ten distinct varieties of this species ; and a paper on *T. orbona*, also with coloured plate of the Rannock varieties—all bred from larvæ by Mr. Clark, at London Fields. As the result of his assiduous study of Lepidoptera, Mr. Clark has amassed a large collection of the various groups of this order of insects, including, besides life histories of *Macros*, many thousands of *Tineina*. All the species are well set ; indeed in this respect Mr. Clark can hardly be excelled, every insect receiving the utmost care and attention. Amongst other things in his cabinet drawers, we observed the curious cases of *Psyche villosella*, one of which was found on heather at Ringwood during last season.

Besides the collection of Lepidoptera, there are drawers full of Coleoptera, Diptera, Libellulidæ, Orthoptera (amongst the latter are four specimens of *Gryllotalpa vulgaris*, the mole cricket) ; also cases of birds, birds' eggs, &c.

In concluding our account we may mention that Mr. Clark was educated privately for the profession of a chemist, and has for many years resided on his business premises at Hackney. Here his entomological visitors are cordially welcomed, and he is always glad to give information respecting the insects in his collections, or render any assistance in his power.

ENTOMOLOGICAL NOMENCLATURE.

BY C. W. DALE.

In 1842, certain rules were adopted by the British Association for Zoological Nomenclature. The most important of these rules was that the 12th Edition of the "Systema Naturæ" of Linnæus should be adopted as the starting point. Mr. Kirby's great "Catalogue of Butterflies" was based upon it in 1871, but when he published a supplement in 1878 he altered his opinion, and the nomenclature of the supplement is based on the 10th Edition, as is also the "Catalogue of the Lepidoptera of Europe," by Dr. Staudinger and Wocke.

The decision arrived at by the British Association was most certainly a wise one. The carefully revised completion of a great work must be a safer starting point than an earlier and admittedly imperfect edition.

A further rule adopted by the British Association gives us what is known as the Laws of Priority, that is, that the name given first shall have preference over others given subsequently. This law, however, must be read in conjunction with the rule fixing the starting point at the 12th Edition of the "Systema Naturæ."

A very important rule, however, was instituted and acted upon by

Linnæus himself, which was that nonsense and barbarous names should be overthrown and replaced by more scientific ones. In a letter to Haller, bearing the date of June 8th, 1737, he wrote: "Those who come after us in the free Republic of Botany will never subscribe to authorities sanctioned only by antiquity, if we retain such intractable names as *Monolasiocallenomenophyllum* and *Hypophyllocarpodendrium*. Why does the termination "oides" displease? Because it is the asylum of ignorance. Botanists of the present day have scarcely introduced any new name but what ends in oides. Witness *Alsine*, *Alsinoides* of Ray, *Alsinella* of Dillenius, *Alsinastrum* of Vaillant, *Alsinastroides* of Keamer, *Alsinastriformis* of Plukenet, *Alsinanthemos* of Ray, and *Alsinanthemum* of Kramer. Can you keep all these distinctly in your head; is it not an abuse?"

Linnæus having given us an instance of barbarous names used in Botany, I will proceed to quote some used in Entomology. Witness *Argus*, *Bellargus* of Rottemburg, *Semiargus* of Rottemburg, *Argusaria* of Boisduval, *Boisduvalis*, *Boisduvaliaria* of Lucas, *Boisduvaliata* of Duponchel. Worse still are such names as *Plecoma staff*, *Hesperia pomesheik*, and *Noctua hatney*, to be found in the record of Zoological Literature for 1870. It was even proposed to call one species by the name of *Knownothing*, but the idea was wisely abandoned by its author. These last, if allowed to stand, would entirely overturn the good old rule "that specific names must be Latin, or at least Latinised." Another rule followed by the entomologists of the earlier part of the century, was that all names, in order to stand, must be accompanied by an intelligible description written in Latin. Even Guènee, in the introduction to his great work on the Noctua of the World, observed, "that when figures or descriptions in old books were wrote so bad he did not follow them. For these reasons the names bestowed on various species by Hœfnägel have been rejected. No one doubted the existence of his names, which appeared with faulty descriptions, written in German, in a Berlin Magazine in 1767. Yet Hœfnägel's names have been used by Dr. Staudinger to supersede names with good figures and descriptions. A sample of his descriptions is given by Mr. Tutt in the "Entomologist" for 1889, p. 109, with an English description. Here is one of them (2) 96, p. 414. "*P. matura*. Brownish grey, with white and yellow markings, which are generally surrounded with brown. Hind wings light yellow, with a broad brown margin. At the leaves of the oaks. July. Of the second size. Very rare."

On reading this description, it occurred to my mind that *Polyphœnis sericina*, Esp., must be the species intended, so I turn to Staudinger's Catalogue, and find that it is the *Cerigo cytherea*, Fab. Next I turn to the description of *Cerigo cytherea* given in Stainton's

Manual, "Fore wings dull grey brown, with the inner and elbowed line whitish; hind wings dull yellowish, with a broad blackish-grey hind margin."

Now as Hœfnägel's description of *Matura* is a very unintelligible one, let us try Fabricius' description of *Cytherea*, "Cristatis alis incumbentibus variegatis; striga alba posticis flavis; margius fresco. Minor N. pronuba. Alæ anticæ cinerco frescogue variæ maculis in medio ordinarici. Pone maculas striga distincta, undata, alba. Posticæ flauræ margius fresco. Subutus anticæ obscura, posticæ pallidæ."

Staudinger's synonymy of this species is *Matura*, Hœfn., 1767; *Texta*, Esp., 1787; *Cytherea*, Fab., 1794.

Now as Staudinger and Wocke have professed to have compiled their catalogue in conformity with the laws of priority, let us have a peep into their catalogue. The species standing first in this work is

Papilio sinon, Poda, 1761.
Podalirius, L., 1763.

It appears that Staudinger took it for granted that the name *Podalirius* was given first in the 12th Edition of the "Systema Naturæ," and was in such a hurry to upset the rule instituted by the British Association that he neglected to look up the other editions. Had he done so, he would have found that Linnæus gave the name in the 10th Edition of the "Systema Naturæ," so that it had three years precedence over the *Sinon* of Poda.

Now let us take the genus *Colias*. Linnæus named a certain species *Hyale*, giving the following description in the 12th Edition of the "Systema Naturæ:"—"Alis integerrimis rotundatis flavis; posticis macula fulva, subtus puncto sesqui-altero argenteo. Faun. Suec., 1040; Scop. Carn., 455; Pet. Gaz., t. 14, f. 11; Raj. Inf., 112, n. 6; Schæff. Elem., t. 94, 7. 7; Geoff. Paris. II, p. 75, n. 48; Edw. Av. 304, f. 1, 2; Roef. Inj. III,, t. 46, f. 4, 5. Habitat in Europa, Africa, America septentionali." Linnæus gives eight references for this insect, seven of which I have been able to consult, and all, without exception, refer indubitably to *C. Edusa*, Fab., and all the figures represent the female.

In Mr. Kirby's "Catalogue of the Butterflies of the World" we find this same species under the name of

Croceus, Fourcroy, 1785.

The proper synonymy of the species should be

Hyale, Linn., 1758 and 1766.
Edusa, Fab., 1776 and 1787.
Croceus, Fourcroy, 1785.

It is a well-known species, and was figured as long ago as 1633 in

"Moufet's Theatrum." Let us now compare the nomenclature of Carolus de Villers. 1789, with that of Fabricius, 1793:

Villers.		Fabricius.
Palæno, L.	=	*Hyale*, L.
Hyale, L.	=	*Edusa*, *F*.

So also Esper., in 1777, gives *Palæno* for *Hyale*, *Hyale* for *Edusa*, *Europome* for *Palæno*. Hubner also figured *Hyale* of Fabricius under the name of *Palœno*, *Edusa* of Fabricius under that of *Hyale*, and *Palœno* of Fabricius under that of *Europome*.

Here is Linnæus' description of *Palœno* "Alis integerrimis rotundatis flavis apice nigris margineque fulvis posticis subtus puncto argenteo. Affinis nimeiun Hyales." Mr. W. F. Kirby, in a paper read at a meeting of the Entomological Society, on Dec. 4th, 1871, states that he had already questioned the correct identification of this insect and felt sure that the insect intended by Linnæus is the female of *Papilio croceus*, Fourc. He goes on to say "*C. palæno* is by far the commonest species in Sweden, and there has never been any doubt about this species, except that some of the older authors who were unacquainted with it gave *Hyale* under this name. Both *C. hyale* and *C. edusa* are of doubtful occurrence in Sweden." (M. Schöjen includes *C. edusa* in his list of the "Rhopalocera of Norway," but not *C. hyale*, see "Entomologist Monthly Magazine," Vol. XXVI., p. 77.) "In one or two cases (*e.g.* by Scopoli and Geoffrey), *Hyale*, Auct, is casually noticed as a var. or as the other sex; but the two species were since properly separated. Linnæus probably included both under the name of *Palœno*. Denis and Schiffermiller in the "Wiener Verzeichniss," (1775), gave *Hyale*, Auct, as *Palœno*, Linn. (certainly an error), and *Croceus* as *Hyale*, another reason why the name *Hyale* should be applied as it was by nearly all the old authors, to the latter species."

If the law of priority is enforced in this instance *C. hyale*, Auct, is nameless. The best way out of the difficulty will be to transfer the name of *Edusa* to it. Thus the Common Clouded Yellow will be *Hyale*, Linn, the Pale Clouded Yellow, *Edusa*. But a better way will be to let the law of usage override the law of priority, thus—*Hyale*, Fab., = *Hyale*, Linn.

THE PTEROPHORINA OF BRITAIN.

BY J. W. TUTT, F.E.S.

(Continued from p. 29).

Of the genus *Leioptilus*, Dr. Jordan writes:—"The Swedish species of this genus are *L. scarodactylus*, *L. tephradactylus*, *L. microdactylus*, *L. osteodactylus* and *L. brachydactylus*. Our own British species are also five, namely, *L. lienigianus*, *L. tephradactylus*, *L. microdactylus*, *L. osteodactylus* and *L. brachydactylus*. There is no reason why *scarodactylus*, the larva of which feeds on the blossoms of *Hieracium umbellatum* and *H. boreale* in August and September, should not be met with in our own country. The moth appears in July. It is larger than *microdactylus*, nearly equal to *osteodactylus* in size, but not so yellow ; the spots are browner than in *microdactylus*, and the lower one is not exactly at the fissure, but rather below it ; the most striking difference, however, is in the dark grey fringe in the upper wings of *scarodactylus*, contrasted with pale brown fringes in *microdactylus*" ("Entomologist's Monthly Magazine," Vol. VI., p. 150).

Leioptilus lienigianus. Zell.—This very local species occurs in certain localities in our south-eastern counties, to which it seems to be almost entirely confined.

SYNONYMY—*Lienigianus*, Zell., "Linn. Ent.," Zeits., VI., 380; H.-S., V., p. 379; Sta. "Man.," II., p. 443. *Scarodactylus* var. *maculata*, Zell., "Isis," 1841. *Melinodactylus*, H.-S., 33.—This species was at first considered to be a variety of the more widely distributed *scarodactyla*, Hb. by Zeller, and at the time he gave it the varietal name *maculata*, but afterwards recognising that it was a distinct species he named it *lienigianus*. It is such a comparatively recently discovered species in Britain that there are no British synonyms.

IMAGO—The anterior wings of this species are divided into two lobes by a deep cleft, the tip of the upper lobe pointed and rather falcate. The colour is of a pale grey inclined to ochreous. There is a black dot near the centre of the wing, but rather towards the base, and a double black dot at the end of the fissure. These latter are sometimes united to form a streak, or are very rarely produced upwards to meet a black longitudinal mark on the costa, thus forming a mark similar to that of *lithodactyla* ; there is another black costal spot towards the apex. The fringes are darker grey, the tip of the upper lobe being almost concolorous with the fringes. The fringe bordering the upper edge of the cleft is almost black, and there is a black dot at the lower outer angle of the upper lobe. The hind wings are uniformly dark grey, the fringes concolorous with the wings. Stainton's diagnosis is:—"9‴. F.-w. greyish ochreous, with an oblique dark streak before the fissure and two blackish blotches on the costa of the anterior lobe" ("Manual," II., p. 443). Mr. Gregson describes the imago as follows :—"The antennæ of the perfect insect are rather short and slender ; the head and thorax light ashy-grey ; the upper wings ashy, tinged here and there with ochreous shades ; costa slightly darker near the base ; then a dark costal streak-like mark near the middle, and another towards the tip of the wing ; between these two marks the costal area is whitish ; under wings ashy. Expands eight to ten lines" ("Entomologist," Vol. III., pp. 186-187). Zeller's description of *lienigianus* is as follows:—"Collari epistomisque brunneis; alis anterioribus gilvescentis-albidis, strigulà obliqua ad fissuram, striola punctoque majore in ciliis costalibus laciniæ anterioris punctisque in laciniarum apicibus fusco-nigris distinctis (♂ ♀)" ("Linn. Entomologica," Vol. VI.,p. 380). I can fully corroborate Mr. Barrett's remarks on the sluggishness of the perfect insect in the daytime. He says:—"The perfect insect is rather sluggish and retiring in its habits. It is pretty common in this neighbourhood (Norwich), yet, previous to rearing it, I had taken but one specimen, and, one afternoon last July, happening to find, in the corner of a field, a lot of *Artemisia*, which had evidently been infested, I spent a considerable time in beating, kicking and trampling the plants and neighbouring rank weeds, before I could compel two specimens to skulk unwillingly out from among them" ("Entomologist's Monthly Magazine," Vol. VIII., p. 158). At night, however, the moths may be found freely on the *Artemisia* plants on which the larvæ have fed up, but even then they are easy to box. Figures of the imago, larva, pupa and food plant of this species are to be found in the "Entomologist," Vol. XV., figs 3, 3a, 3b, 3c.

Larva—Mr. C. G. Barrett gives a most interesting account of the habits of the larva. He writes:—"On May 26th, 1870, I caught sight of a bladdery-looking leaf of *Artemisia vulgaris*, which I instantly recognized, and had the exceeding satisfaction of finding the pretty little hairy larva of *Pterophorus lienigianus* very much at home, with several more occupying other leaves of the same plant. This larva has the most singular mode of life of any plume larva with which I am acquainted. When young, it gnaws oblong blotches near the tips of upper leaves of the *Artemisia*, leaving the cuticle of the upper side entire and nearly transparent, eating the parenchyma, and carefully rolling back the downy skin of the upper side to the edge of the blotch (as is done by the larva of *galactodactylus* on burdock). These blotches are seldom more than half an inch long, but generally there are two or three of them side by side. When about one-fourth grown, the larva moves down to a lower leaf, which it draws together, uniting the tips underneath and carefully sewing together the edges of the segments, so as to make a secure little tent, inside which it feeds as before, only making larger blotches side by side between the ribs of the leaf until the greater part of the parenchyma is devoured, after which it deserts this habitation, makes another lower down, and so on, constructing four or five tents before becoming full-grown. Then, disdaining to make use of the larval habitation as a protection for the pupa, it descends towards the ground and becomes a hairy pupa on the lower part of the stem, or on some bit of stick or other convenient object" ("Entomologist's Monthly Magazine," Vol. VIII., p. 157). Mr. Buckler describes the larva as follows:—"The full-fed larva is little more than than three-eighths of an inch in length, cylindrical, though tapering a little behind; the head a trifle smaller than the second segment, and rather rounded, greyish-brown in colour, and marked with blotches of blackish-brown on the lobes and between them, and is very shining; the body is pale glaucous-green, and has a very broad dorsal stripe of darker bluish-green, through the middle of which runs an exceedingly fine pale thread of the ground colour; the shiny sub-dorsal line is yellowish-white, and just above it is a whitish-grey parallel streak: all these are regularly interrupted at segmental divisions, these divisions are somewhat yellow; the spiracles are whitish ringed with brown; there is a white wart on the hinder part of the side of the third and fourth segments; all the tubercles are whitish, each bearing little fascicles of about four white silky hairs, curved and finely pointed; the ventral surface and legs a little paler than the rest of the ground colour" ("Entomologist's Monthly Magazine," Vol. VIII., p. 158). With regard to the possibility of this species having another foodplant, Mr. W. G. Sheldon writes:—"As far as I can ascertain, *Leioptilus lienigianus* has not yet been recorded as occurring in Surrey. On the 18th July last, I captured a specimen which was feasting on the flower of a thistle. I have since made a careful search for its food-plant (*Artemesia vulgaris*), but am unable to find it within two miles of the spot where the specimen occurred. As the species is endued with only a limited power of flight, it therefore seems possible that there may be some other pabulum" ("Entomologist," Vol. XXI., p. 113).

PUPA—The pupa is described by Mr. South as follows:—"Whitish green, with a fine yellowish line down the centre of back, and a few oblique dark dorsal markings; warts and hairs similar to those of larva. The oblique markings vary in intensity, sometimes giving the whole dorsal area a brown coloration; wing-cases green, antennæ and legs darker anterior. Sometimes the upper part of the pupa is yellowish, wlth a pink tinge, and the oblique stripes reddish brown. Fixed by tail to under side of leaf of mugwort of food plant, looking not unlike the larva at rest. June" ("Entomologist," Vol. XV., p. 105). Of the habits of the pupa, and the way in which it is protected by its environment, Mr. Barrett writes:—"Early in July, 1870, in a country lane some miles from Norwich, I chanced to find a plant of *Artemisia vulgaris*, the leaves of which were eaten in a fashion different to anything I had before seen, so curiously indeed that I could not at that time imagine to what *family* even the larva could belong, and to make the matter worse, it appeared to be quite deserted. At home I again examined the plant, but, finding nothing threw it aside, and was not a little surprised a few days afterwards, at finding a specimen of *Pterophorus lienigianus* at rest on the ceiling. The riddle was therefore solved—it was clear that the pupa had been so well hidden that I had overlooked it." He then adds :—"The pupa strongly developed the curious power (shared more or less by most of those of the *Pterophoridæ*) of throwing its head back over its tail with considerable force. Thus, anything touching the anal segment is pretty certain to receive a smart rap, delivered backwards, from the head of the pupa. Everyone must have observed that when a plume emerges the pupa bend back so as to allow the moth to use its long legs as soon as they are freed from the envelope. The deserted tent is a curious object, with its oblong windows edged with white down, and its seams made as neatly as a spider even could do it. In the case of large leaves, only one of the divisions is made use of, the whole leaf being beyond the powers of the architect. In confinement, these larvæ, like those of *teucrii*, throw off their protective habits and make no tent, but simply feed under the leaves in their usual fashion. Unlike *teucrii*, however, they are very easy to rear, as, with a little care, nearly every specimen produces the perfect insect" ("Entomologist's Monthly Magazine," Vol. VIII., pp. 156-157).

Habitat—The only localities in which I have found this species are (1) a bank by the roadside between Deal and Sandwich and (2) under a hedge bordering a cultivated field. In the first place, the *Artemisia* plants are somewhat isolated and directly in the path of those pedestrians who prefer to walk on the green sides of a country lane to the dusty road. This locality has practically, from this cause, been ruined. The second locality produces an abundance of plants of *Artemisia* just under a hedge which forms the border of a cultivated field. Mr. Barrett records it from a lane near Norwich so that shady places and country lanes would appear to be the favourite haunts of this local species. Staudinger and Wocke's localities lead us to look on this as a strictly local species and it appears to be confined to "Livonia, Germany and Central Italy." It is a species, therefore, not likely to be met with in the northern parts of Britain. Stainton gives as localites "Ventnor (Isle of Wight) and Deal."

Time of Appearance—The moth appears in July and August according to the season. In 1885, my brother-in-law, Mr. Ovenden and myself, took some 30 to 40 freshly-emerged specimens at Deal as early as July 4th. Since then the moth has been rare at Deal, and I have only taken a few specimens towards the middle of July, whilst in that excessively cold summer, 1888, the only specimens I saw were found in the middle of August. In 1890, very worn specimens were captured during the first week in August. Mr. C. G. Barrett records it in July, 1870, from near Norwich; Mr. Sheldon, in Surrey, on July 18th; Stainton only gives July.

Reports of Societies.

ENTOMOLOGICAL SOCIETY OF LONDON.

February 8th, 1893.—Henry John Elwes, Esq., F.L.S., F.Z.S., President, in the chair. The President announced that he had nominated Mr. F. DuCane Godman, F.R.S., Mr. Frederic Merrifield and Mr George H. Verrall as Vice-Presidents during the Session 1893-94. Mr. Charles R. C. Hibbert, of Holfield Grange, Coggeshall, Essex; Mr. Oswald B. Lower, of Bleak House, Parkside, Adelaide, South Australia; and Mr. John Baxter Oliver, of 12, Avenue Road, St. John's Wood, N.W., were elected Fellows of the Society. Mr. S. Stevens exhibited a specimen of *Chœrocampa celerio*, in very fine condition, captured at light, in Hastings, on the 26th September last, by Mr. Johnson. Mr. A. J. Chitty exhibited specimens of *Gibbium scotias* and *Pentarthrum huttoni*, taken by Mr. Rye in a cellar in Shoe Lane. He stated that the *Gibbium scotias* lived in a mixture of beer and sawdust in the cellar, and that when this was cleaned out the beetles disappeared. The *Pentarthrum huttoni* lived in wood in the cellar. He also exhibited *Mezium affine*, taken by himself in a granary in Holborn Mr. McLachlan exhibited a large Noctuid moth, which had been placed in his hands by Mr. R. H. Scott, F.E.S., of the Meteorological Office. It was stated to have been taken at sea in the South Atlantic, in about lat. 28° S., long. 26° W. Colonel Swinhoe and the President made some remarks on the species, and on the migration of many species of Lepidoptera. Mr. W. F. H. Blandford exhibited larva and pupæ of *Rhynchophorus palmarum*, L., the Gru-gru Worm of the West Indian Islands, which is eaten as a delicacy by the negroes and by the French Creoles of Martinique. He stated that the existence of post-thoracic stigmata in the larva of *R. cruentatus* had been mentioned by Candèze, but denied by Leconte and Horn. Theu were certainly present in the larva of *R. palmarum*, but were very minute. He also exhibited a piece of drawing wood, showing extensive injury by longicorn larvæ during a period extending over seven years. Mr. G. T. Porritt exhibited two varieties of *Arctia lubricipeda* from York; an olive-banded specimen of *Bombyx quercus* from Huddersfield; and a small melanic specimen of *Melanippe hastata* from Wharncliffe Wood, Yorkshire. Mr. H. Goss exhibited a few specimens of Lepidoptera, Coleoptera, Hemiptera, and Neuroptera, sent to him by Major G. H. Leathem, of the 31st Regiment, who had collected them, last June and July, whilst on a shooting expedition in Kashmi territory, Bengal. Some of the specimens were taken by Major Leathem at an elevation of from 10,000 to 11,000 feet, but the majority was stated to have been collected in the Krishnye Valley, which drains the glaciers on the western slopes of the Nun Kun range. Mr. Elwes remarked that some of the butterflies were of great interest. Mr. G. F. Hampson exhibited a curious form of *Parnassius*, taken by Sir Henry Jenkyns, K.C.B., on the 29th of June last, in the Gasternthal, Kandersteg. Mr. J. M. Adye exhibited a long series of remarkable varieties of *Boarmia repandata*, taken last July in the New Forest. Mr. C. O. Waterhouse exhibited a photograph of the middle of the eye of a male *Tabanus*, showing square and other forms of facets, multiplied 25 times. Mr. Roland Trimen communicated a paper entitled "On some new, or imperfectly known, species of South African Butterflies," and the species described in this paper were exhibited. Mr. T. D. A. Cockerell communicated a paper entitled "Two new species of *Pulvinaria* from Jamaica. Mr. Martin Jacoby communicated a paper entitled "Descriptions of some new genera and new species of Halticidæ."

February 22nd, 1893.—Henry John Elwes, Esq., F.L.S., F.Z.S., President in the Chair. Mr. Kenneth J. Morton, of Glenview Cottage, Carluke, N.B.; Herr A. F, Nonfried, of Rakonitz, Bohemia; and Mr. Charles B. Taylor, of Rae Town, Kingston, Jamaica, were elected Fellows of the Society. Mr. F. J. Hanbury exhibited, on behalf of Mr. Percy H. Russ, of Sligo, several long and very variable series of *Agrotis tritici*, *A. valligera*, and *A. cursoria*, togather with Irish forms of many other species, some of which were believed to be new to Ireland. Mr. W. H. B. Fletcher and Mr. J. W. Tutt made some remarks on the species. Mr. R. W. Lloyd exhibited specimens of a species of *Acarus* found in New Zealand wheat. He stated that Mr. A D. Michael had examined the specimens, and pronounced them to belong to *Tyroglyphus farinæ*, a species which had been known for over a hundred years as a destroyer of corn, and was only too abundant all over Europe, and probably over the temperate regions of the world. Dr. T. A. Chapman exhibited, by means of the oxy-hydrogen lantern, photographs of the larva of *Nemeobius lucina* in its first stage, showing the conjoined dorsal tubercles, each carrying two hairs, which are remarkable in being divided into two branches. For comparison he also showed by means of the lantern, drawings of the young larva of *Papilio ajax*, after Scudder, and of a portion of a segment of *Smerinthus populi*, as the only instances known to him of similar dichotomous hairs in lepidopterous larvæ. Mr. Poulton pointed out that he had described the forked hairs of *Smerinthus* in the Entomological Society's 'Transactions' for 1885, and that such hairs were even better developed in the genus *Hemaris* originally described, as he believed, by Curtis. Mr. Poulton also said that he had noticed similar forked hairs covering the newly hatched larvæ of *Geometra papilionaria*. Mr. Poulton exhibited, and made remarks on a number of cocoons of *Halias prasinana*, in order to show the changes of colour produced in them by their surroundings; he also exhibited the coloured backgrounds employed by him in his recent experiments on the colour of larvæ and pupæ, and illustrated his remarks by numerous drawings ou the blackboard. Dr. Chapman read a paper —which was illustrated by the oxy-hydrogen lantern—entitled "On some neglected Points in the Structure of the Pupa of Heterocerous Lepidoptera and their Probable Value in Classification." A discussion ensued, in which Mr. Elwes, Mr. Poulton, Mr. Champion, and Mr. Merrifield took part. Dr. F. A. Dixey communicated a paper entitled "On the Phylogenetic Significance of the Variations produced by Differences of Temperature on *Vanessa atalanta*." The President, Mr. Merrifield, Mr. Poulton, Dr. Chapman, and Mr. Tutt took part in the discussion which ensued. —H. Goss, *Hon. Secretary*.

CITY OF LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY.

Tuesday, February 7th, 1893.—Exhibits. Mr. Mera, a fine series of *Hybernia defoliaria*, full ochreous, with a very clear dark band. These were all from one batch of eggs, and showed the effects of heredity, as almost every specimen was distinctly banded and followed the parent form, none of the usual unicolorous specimens being bred with them. Mr. Huckett, bred specimens of *Hybernia defoliaria*. He remarked that these had emerged almost continuously from October until the present time. Mr. Prout, several Geometræ with the transverse lines approximating the enclosed band in some cases revolving itself into a line. These included specimens of *angularia*, *pennaria*, *abbreviata*, *variata*, *ocellata* and *montanata*. Mr. Boden, *Coccyx strobilana*, *C. splendidulana*, *C. argyrana*, *C. abiegana*, *C. nanana*, and *C. vacciniana*, all from West Wickham, Mr. Gates, *Hypercallia christiernella*, from Sevenoaks. Exhibits of the genus *Xanthia* were made by Messrs. Bacot, Battley, Boden, Clark, Gates, Hodges, Riches, Routledge, Sequeira, Southey and Tutt. Mr. Tutt then read his paper on "The Genus Xanthia," after which a discussion took placa.

Tuesday, February 21st, 1893.—Exhibits. Dr. Buckell, specimen of *Coremia unidentaria*, red vars., bred from a black banded female. Mr. Robson, *Zygæna filipendulæ* with five spots on the forewings, also two specimens of the var. *cerinus*, and a variety of *Arctia mendica* with cream coloured anterior wings. Mr. Nicholson, an asymmetrical specimen of *Catocala sponsa* from the New Forest, and a specimen of *Vanessa urticæ* without the two small spots on forewings. Mr. Machin, a British specimen of *Sphinx pinastri*, and four melanic forms of *abietaria* bred from Box Hill larvæ. The following were amongst the exhibits of melanic Lepidoptera. Mr Hodges, a number of species, including *Stauropus fagi*, *Agriopis aprilina*, *Caradrina cubicularis*, and *Melanthia rubiginata*. Mr. Smith, dark females of *Argynnis aglaia* from Blandford. Mr. Simes, black vars. of *Noctua xanthographa* and *Agrotis nigricans* from Aberdeen, and a dark underside of *Chortobius pamphilus* from Epping. Mr. Riches, dark forms of *Hemerophila abruptaria*. Mr. Battley, *Acronycta psi*, *Aplecta nebulosa*, *Hybernia progemmaria*, &c. from the London district. Dr. Sequeira, *Boarmia repandata*, *Hemerophila abruptaria* and *Polia chi* var. *olivacea*. Mr. Clark, a black specimen of *Limenitis sibylla* and suffused forms of *Polyommatus phlœas* and *Venilia maculata*. Mr. Tutt, dark and light forms of *Xylophasia polyodon*, *Gnophos obscurata* and *Tephrosia biundularia*. Coleoptera: Mr. Heasler, *Quedius scitus*, *Opilus mollis*, and *Cis nitidus*, all from Richmond. Mr. Bellamy, stuffed specimens of the Fieldfare and Green Woodpecker. Mr. Robson then read his paper, entitled "Is Melanism in Lepidoptera caused by Moisture." An animated discussion followed, and the proceedings terminated with a vote of thanks to Mr. Robson.

THE SOUTH LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY.

February 9th, 1893.—Mr. J. Jenner Weir, F.L.S., President in the chair. Mr. Frohawk exhibited hybernating larvæ of *E. janira* and stated that they fed intermittently throughout the winter, seldom remaining ten or twelve days without food. Mr. Adkin, a bred series of *A. prasina* (*herbida*) the ova having been obtained from a moth captured at Polegate, Sussex, during the past summer. Mr. Waller, a bred series of *S. tiliæ*, one of which exhibited a tendercy towards melanism. Mr. McArthur, *T, gothica* var *gothicina*, *C. cosmophorana* and *R. duplana*, and a discussion ensued, Mr. Barrett stating that the original specimens of so-called *R. duplana* were only small specimens of *R. turionana*. Mr. Adye, a fine and variable series of *B. repandata* taken at sugar in the New Forest, July, 1892. Mr. Weir exhibited a photograph taken from *Insect Life* for January, 1893, of a twig bearing some two dozen specimens of *Anosia plexippus* restiug at night during migration, and read a paper which illustrated the migratory instinct of this, and indirectly, of other species. A discussion, in which Messrs. Barrett, Weir and Hawes took part, then followed, it being noted that whereas some dozen or more captures of *A. plexippus* were recorded for this country, only three were known to have been taken on the Continent of Europe. Mr. Mansbridge exhibited specimens illustrating his paper, and read "Notes on melanism in Yorkshire Lepidoptera" remarking on the tendency to melanism shewn by many species within the boundaries of the towns, whilst in damp spots barely five or six miles away, the same species would appear in quite its normal, *i.e.*, light coloration, Many instances were cited, chiefly among the Noctuæ and Geometræ. Mr. Tutt proposed and Mr. Barrett seconded a vote of thanks to Mr. Mansbridge for his paper, Mr. Tutt observing that although many species, especially among the Noctuæ, were darker in the uorthern districts, yet several, *i.e.* *T. pronuba* at Deal and *H. aurantiaria* from Epping Forest, showed an equal tendency to melanism in more southern localities,—T. W. HAWES and H. WILLIAMS, *Hon. Secs.*

LANCASHIRE & CHESHIRE ENTOMOLOGICAL SOCIETY.

February 9th, 1893. The President, (Mr. S. J. Capper, F.L.S., F.E.S.), who was in the chair, referred to the death of the Rev. F. O. Morris, which occurred last Saturday, in his eighty-third year.—Mr. C. H. Hesketh Walker read a paper entitled "Pond Life." Referring to hobbies generally, he considered natural history was one of the most interesting. He then stated that a stagnant pond was a paradise prolific in animal life, and poetically described it with all its attendant insects, &c., showing by a table that examples of most of the animal kinghom from Protozoa to Mammalia were to be found therein. Proceeding, he gave brief descriptions of these animals, illustrating his remarks by rapidly drawn figures on the black board.—The president exhibited some fine varieties of *Arctia caja*, and a number of port wine corks completely riddled by some coleopterous or lepidopterous larvæ. Mr. Locke, *Carabus glabratus* from Langdale Pikes. Mr. Deville, *Goliathus gigauteus*, from Cameroons; and Mr. Gregson, *Noctua triangulum*, from Lancashire and London.—F. N. Smith, *Hon. Secretary*, 143, Smithdown Lane, Liverpool.

GUERNSEY SOCIETY OF NATURAL SCIENCE AND LOCAL RESEARCH.

The usual monthly meeting was held on Wednesday, the 8th February, at the Guille-Allès Library, the chair being taken by Mr. E. D. Marquand, President. The following note was read by Mr. Derrick, and two of the bats referred to, which had been neatly preserved and mounted by Mr. Puttock, the caretaker of Guille-Allès Library, who being informed of the find, proceeded to secure some of the creatures for examination, and for preservation in the museum. He found some of them hanging singly, others in little clusters of from 8 to 15, there being about 60 in all. Being torpid, though they shrank at the approach of light, they were easily captured. They all belonged to the same species, being apparently *Rhinolophus Ferrumequinum*, *Rhinolophus* is distinguished by a nasal crest. There are only two species found in Britain and both are rare. The specific name *Ferrumequinum* is given because of the fancied resemblauce of this nasal crest to a horse-shoe. These are, therefore, horse-shoe bats. Ansted, in his work on the *Channel Islands*, gives two kinds of bats only as natives of Guernsey, viz., *Plecotus auritus*, the long-eared bat; and *Vespertilio pipistrellus*, the common bat; so that this horse-shoe bat forms an addition to the list of local mammalia. There is also a specimen of the above in the museum of the Guille-Allés Institution which was captured last year at the Vale Castle. Mr. Collenette exhibited two rudely cylindrical masses of baked clay, bearing the impression of the thumb and fingers. These examples were found in the Cromlech at L'Ancresse by Mr. Lukis, and are exactly similar to those found at Richmond last year, associated with deposits of limpet shells. Mr. F. Rose, L.D.S., of London, then gave the first part of his promised lecture on "The Minute Anatomy of the Teeth and Jaws of Vertebrates," which was followed by an interesting discussion.

IS MOISTURE THE CAUSE OF MELANISM?

BY JOHN E. ROBSON, F.E.S.

(Read before the City of London Entomological & Natural History Society, Feb. 21st, 1893.)

Entomologists have been puzzled for the last half century to explain the curious fact that the markings on the wings of Lepidoptera in certain districts were gradually becoming darker. In those whose colouring contained any portion of black, these black scales increased in number until the surface was more or less suffused with them. In those where black did not form a portion of the original colouring, then the scales of the darkest hue increased in the same way and the wings became suffused with this darker shade. For this phenomenon the term Melanism was adopted, and after a little time it was restricted in its application to those species which had become blacker, and the term Melanochroism was applied when the species had become darker in hue without a suffusion of black scales. The *Doubledayaria* of *Betularia* will serve as an illustration of one, and the variety *Unicolor* of *Xerampelina* as an example of the other. Believing that both these forms of variation are produced by the same exciting cause, I propose to avoid needless repetition by using the word *Melanism* as a generic term including the whole.

The late Mr. Edleston was the first person to call attention to this remarkable phenomenon. Rather more than 50 years ago he wrote to "Newman's Entomologist" in reference to the increasing numbers of what he called the "negro aberration" of *Betularia*. He had exposed some virgin females in his garden and was surprised to find most of the visitors were of this "negro aberration." He said this form was almost unknown sixteen years before, and, contrasting it with its increased numbers when he wrote, said "if this goes on for a few years the original type of *Betularia* will be extinct in this district."

I do not find any further allusion to what was going on until 1876, when the late Edwin Birchall wrote a very remarkable paper, "On Melanism," in the "Entomologist's Monthly Magazine," Vol. XIII., p. 131. In this paper Mr. Birchall condensed into less than three pages, almost everything that has been said on the subject from that time to the present. He spoke in general terms of the localities where Melanism prevailed, viz., the Highlands of Scotland, Ireland, the Isle of Man, Durham, South Lancashire and the West Riding of Yorkshire; and pointed out that where it prevailed there was also but a meagre lepidopterous fauna. He suggested "as not improbably among the causes at work in limiting the numbers of Lepidoptera in Scotland, Ireland, the Isle of Man, and the North of England:—The peculiarities of the climate of Ireland and the Isle of Man being deficient sunshine, excessive moisture, and the almost entire absence of frost, it may be suggested that under such conditions the hibernation of larvæ and the sleep of pupæ are incomplete and that damp and mould make many victims. Over wide districts of Yorkshire, Lancashire and Durham—those very districts where Melanism occurs—the air is polluted by mephitic exhalations from furnaces and chemical works, the sun is obscured by clouds of coal smoke, and the vegetation defiled and destroyed by deposits of soot; in some of the worst districts, such as St. Helens and Bradford, lepidoptera scarcely exist at all. In the Highlands of Scotland, although the air be purity and the sunshine brightness, the long, cold, wet winter, and the late spring, can hardly fail to check the multiplication of those forms of life which have their metropolis in warmer southern lands." Mr. Birchall then goes on to show, by quotations from Darwin and Wallace that black and dark colours are advantageous to animals, and concludes his arguments thus: "As it appears certain that greater strength of constitution and more powerful and acute perceptive faculties are, from some yet unknown cause, associated with dark colours in the *vertebrata*, may we not presume that insects are subject to the same law, and that dark varieties of Lepidoptera are able to spread and increase under adverse conditions, whilst the lighter coloured types fail to do so and are consequently eliminated in the struggle for life, and that the occurrence of melanic forms may be thus reasonably explained as a simple case of the survival of the fittest." He then enumerated between 30 or 40 species of Lepidoptera in which Melanism had been observed, a list which could now be very largely added to.

A long and interesting discussion ensued, both in the "Entomologist's Monthly Magazine" and in the "Entomologist," in which many of the points only briefly touched on by Mr. Birchall were enlarged upon and discussed at length. The only one of the various papers which then appeared from which I need trouble you with quotations is by Mr. Barrett "On the Degree of Tendency to Variation exhibited by the Lepidoptera of Pembroke and Neighbourhood." He referred first to the fact that "Lepidoptera whose larvæ feed in trees are almost totally absent." This he thinks arises from the mildness of the winters and in a far larger degree from their extreme humidity, but he thinks the principal cause of the exclusion of tree-feeding species is "the furious violence of the storms, which, coming across the Atlantic, rush upon this coast from the south-west with a fury which the trees themselves can barely resist." He then comments on the little variation he has observed, and concludes "that the special peculiarity of climate likely to affect these species is its excessive moisture, and that the tendency is (as suggested) to deepen or intensify the colour and markings, but that there is not, with this abundance of rain, an excessive decrease of light, since the rain falls rapidly and heavily; there are comparatively few cloudy days without rain in proportion to what are experienced in drier districts; and the frequent and brilliant sunshine and exquisitely clear and pure blue sky affords a striking contrast to that of the Metropolitan and manufacturing districts in which cases of Melanism are so frequent, and consequently cases of pure Melanism appear to be very rare here."

In 1885, Lord Walsingham took for the subject of his Presidential address to the Yorkshire Naturalists' Union "Some probable causes of a tendency to Melanic variation in Lepidoptera of High Latitudes." In this paper he proved, as the result of actual experiment that dark coloured Lepidoptera absorbed heat more rapidly than did those of paler hues. He showed how great an advantage was derived by darker insects under special climatic conditions. From their power of more quickly absorbing invigorating warmth they developed more rapidly and were able to take advantage of any transient gleam of sunshine. As this important pamphlet is no doubt familiar to most of you, I need not quote from it at length, but it sought to establish the fact that wherever the direct rays of the sun are interrupted, whether through the mist and cloud of Alpine regions or from any other cause, that there we might reasonably expect to find Melanic forms, and did so. "The smoke of our furnaces in the manufacturing districts and of our chimneys in large towns undoubtedly deprive our urban population of their fair share of undiffused sunlight within the radius affected by them. Accordingly we find several instance of more or less Melanic forms occurring in such situations." The illustrations I need not quote. He then goes on: "We should expect insects occurring in dense forests to be darker than those of the open country, and so far as my Californian experiences goes this is undoubteldy the case." He also tell us that "all fishes from the very deep sea, inaccessible to the sun's rays, are either colourless or entirely black."

This was the first attempt to show why Melanic forms obtained a preference in the struggle for existence and gave us another step towards a knowledge of the causes of variation. Two years later Mr. D'Obree published a paper on the subject in the "Entomologist" (Vol. XX., p. 25), in which he claimed to have destroyed Lord Walsingham's argument. But Mr. D'Obree was a student of Noctuæ only, and no conclusion based on study of an entire order could be upset by reference to one portion only of such order. Mr. D'Obree's conclusions were that "Melanism is primarily due to the peculiar geographical position of these islands. This wave of migration was arrested on reaching our most northern shores, with the natural outcome of stunted forms, and Melanism became the result of the want of accustomed succulent food and of a climate warmer certainly than that within the Arctic circle, but still sufficiently cold and with sufficiently short summers to arrest the development capable in the milder climate of the insect's original home. The appearance of Melanism in the high mountainous regions of Continental Europe, where the same causes obtain, as in our extreme north, helps to support this view. Yorkshire Melanism" (in which I suppose he includes Lancashire and Durham also) "may be treated as a merely local aberration not affecting the general position."

MUSEUM

EXCHANGE.

Exchange.—Wanted—Magic Lantern Slides of Insects. Any order, and either eggs, larvæ, pupæ, perfect insects, or dissections desired. Will give Lepidoptera in return, or Cash. —John E. Robson, Hartlepool.

Duplicates.—Lucernea, Dahlii, Adusta, Gemina, H. urticæ*, Carpini, Fuliginosa*, Solidaginis, C. nigrum, Rurea, var. Combusta, Basilinea, Suspecto, Lueipara. Well set and in black pins. Desiderata very numerous.—G. E. Hartley, 34, Castle Street, Aberdeen.

Duplicates.—Pudorina, Umbrosa. Immutata, Statices, A. Cratægi,* Anachoreta,* etc. Desiderata—Rufina, Lota, Spadicea, Fimbria, Croceago, Citrago, Dahlii, Haworthii, Saucia, Subtusa, Oxyacanthæ (dark), Herbida, Rhizolitha, Myrtilli, Parthenias, Verbascalis, etc.—J. W. Tutt, Westcombe Hill, S.E.

Exchange—Marine Shells from New Zealand offered for foreign land and fresh-water shells, Microscopic slides illustrating useful or noxious insects, or botanical or entomological lantern slides.—W. A. Gain, Tuxford Newark.

Exchange (Duplicates)—E. minutata var. Knautiata Gregson, and many common species. Desiduata, numerous.—C. E. Stott, Manchester Road, Bolton-le-Moors.

Eychange (Duplicates)—Viretata, lobulata, E. edusa, solidaginis, suffusa testacea, lonicerae, citraria, pyramidea, cardui, selene, euphrosyne all on black pins. Desiderata, very numerous. —P. W. Abbott, Four Oaks, near Birmingham.

Duplicates—Fine Blaudina, Davus (Scotch), Euphrosyne, V. urticæ (Scotch), Mendica, Fulginosa and borealis, Loniceræ, Capsincota, Myricæ, Menyanthidis, Adusta, Rectilinea, H. urticæ; Duplaris (dark), Rurea (vars.) Polyodon (dark). Plantaginis, Conflua, Plecta, Wavaria, Maculata, Atomaria, Pinetaria, Lobulata, Suffumata, Corylata (light), Testata, Populata (vars), Fumata, Atomalis, Hastiana, Ministrana, Cosmophorana, Ochracella.—T. Maddison, South Bailey, Durham.

Duplicates.—Ægon, Blandina, Davus, Tiliæ, Loniceræ, Filipendulæ, Petasitis, Conigera, Tritici, Carpophaga, Polyodon (black vars.) Festiva—vars. Biundularia, Zonaria, Silaceata, Ulmata, Basilinea, Umbrosa, Gothica, Rubricosa, Gracilis, Albicolon, Rurea, and vars. Testacea (dark and light), Micacea, V. aureum, &c., &c. Desiderata, very many common species to enlarge series.—John E. Robson, Hartlepool.

Birds' Eggs for Exchange.—Great Plovers, Razorbills, Guillemots, Jackdaws, Magpies (variable series or clutches), Sand Martins, Com. Terns, Puffins, Blackcaps, Partridges, Lapwings, Moor Hens, and one Golden Plover.—Wanted Cuckoo's eggs with clutches, and many other species.—E. G. Potter, 19, Price Street, York.

CHANGE OF ADDRESS.

J. B. Hodgkinson, after 9th March, *from* Ashton-on-Ribble to 14, West Cliff, Fishergate, Preston.

Lieut. Brown, *from* The Camp, Shorncliffe. to Enniskillen, Ireland.

MEETINGS OF SOCIETIES.

CITY OF LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY Meets on the First and Third *Tuesdays* in each month, at the London Institution Finsbury Circus, E.C., from 7.30 to 9.30 p.m. The following programme has been arranged: March 7th "Conchology." Mr. J. B. Rosevear; Mar. 21st, "Specific nomenclature, present, past, and future," Dr. F. J. Buckell.—A. U. Battley and J. A. Simes, *Hon. Secs.*

ENTOMOLOGICAL SOCIETY OF LONDON, 11, Chandos Street, Cavendish Square, W. Wednesday, March 8th and 22nd, 1893, at 7 o'clock in the evening.

THE SOUTH LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY, Hibernia Chambers, London Bridge, S.E. Meetings: Second and fourth *Thursdays* in each month. The Annual Dinner will be held at the Bridge House Hotel, London Bridge, on Thursday, 2nd March, at 7-30 p.m.

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TO CORRESPONDENTS.

A Portrait of the Rev. W. F. Johnson, of Armagh, will appear in the next part.

This part contains a portrait of G. A. Clark, President of the City of London Entomological and Natural History Society.

Arrangements are now completed for continuing the Molluscan Section. W. A. Gain, Esq., of Tuxford, Newark, has kindly undertaken the Land and Fresh Water Mollusca, and Brocton Tomlin, Esq., of The Green, Llandaff, will attend to the Marine Section. Communications may be made to either of these gentlemen. All letters requiring a reply by post should contain stamp.

The Section for Coleoptera is conducted by G. A. Lewcock, Esq., , Oxford Road, Islington, to whom also direct communication may be made.

Mr. Lewcock also represents the Magazine in London, and will receive subscriptions, papers and notes for publication, &c., &c.

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Mr. J. Jenner Weir replied to this paper, and with very good reason, intimated that Mr. D'Obree had not properly understood Lord Walsingham's theory. Mr. Weir spoke of the extreme clearness of the atmosphere in the Netherlands, Belgium, France, Germany, the Tyrol, Bohemia, Spain, and Italy, *except* in the mountains. "In the mountains of Switzerland and the Tyrol the clearness of the atmosphere was nearly as great, but constantly interrupted by dense mists and clouds, and it is precisely in these altitudes that melanism becomes the rule rather than the exception ; many of the topomorphic varieties are melanic, and many of the Alpine species are very dark ; *Pieris rapæ* (an error for *napi*) *v. Bryoniæ* may be given as an example of the former, and the males of *Melitæa cynthia* of the latter. This uncertain condition of the weather is characteristic of the climate of the British Isles. The result is that our indigenous Lepidoptera are, as a rule, darker in colour than the continental, and the tendency to melanism increases northwards, till it may be said to culminate in the Shetlands."

Mr. Cockerell continued the discussion, and though he admits the suggestiveness of some of Mr. D'Obree's facts, he thinks "the deductions he draws from them are perhaps open to question. From the presence of melanic forms in mountain regions, and in the West of Ireland and Scotland, it seems only natural to suppose that the peculiar features of these regions are responsible for the variation ; and of all causes that seem probable from this point of view nothing comes more prominently before us than the extreme mistiness and dampness of the atmosphere."

Mr. Dale in the Introduction to his British Butterflies gave a brief note on the subject, and contended that light colours rather than dark absorb heat. He says "the dry chalk soils of the south absorb a greater amount of heat than the wet peaty soils of the north, and to that, in conjunction with the fact that there is more rain and consequently less sunshine in the north is melanism entirely due." Lord Walsingham replied to this in the succeeding part of the "Young Naturalist," and contended that Mr. Dale's arguments supported his theory, and that differing from "birds and other animals, which require to retain heat rather than to absorb, and as quickly radiate, or loose it, insects, on the contrary, require rapidly to take advantage of transient gleams of sunshine during the short summer season, and may be content to sink into a dormant condition so soon as they have secured the reproduction of their species."

The next to write upon the subject was Dr. Chapman, who said he considered Melanism to be "a western rather than a northern form of variation ; to be associated with a wet rather than a cold climate ; and it has certainly been more common of recent years, which may be attributed to the long succession (unprecedented) of wet seasons we have passed through."

I now have very briefly reviewed the various articles that had appeared prior to 1890, when Mr. Tutt gave his theory to the world. From what I have already quoted it will be seen that the idea that moisture was the cause of Melanism did not originate with Mr. Tutt, and indeed, he tells us that it was first suggested to him by a paper read by Mr. Cockerell at the South London Entomological and Natural History Society in 1887. But I call it his theory because he was the first to connect it with the warm waters of the Gulf Stream, and further, because he made himself responsible for it in a very unusual way. It was produced as the first Editorial communication to a new Magazine which claimed for itself special connection with questions affecting variation, and being reprinted in a volume of nearly 70 pages, it obtained an amount of attention it would certainly not have received had it appeared as an ordinary magazine article. Mr. Tutt tells us on p. 65, that what he has "written on this subject has grown from a comparatively short paper prepared a considerable time ago." It is easy to see this was so, for in studying the pamphlet we find in the first few pages a clearly defined and perfectly intelligible theory, which if not absolutely original in conception, was certainly so in the manner in which the facts and arguments were marshalled and presented in support of the leading idea. But as the paper grew, this clearly defined theory became dim and obscure, and so many side issues were raised and discussed, that the original idea was almost if not entirely lost sight of.

Mr. Tutt refers to the Gulf Stream as having a very well known influence on our climate, and shows how the westerly winds which prevail in Britain "blow over the Gulf Stream, hence in their course they become exceedingly humid, and laden with moisture before they reach our shores." He then points out the districts in Britain which he considers most affected by this assumed humidity from the Gulf Stream, and attempts to show that these are the districts where melanism most prevails.

But if moisture or humidity be the cause of melanism, it would be reasonable to expect a preponderance of melanic forms in all places where moisture exists in excess. In our fens and bogs, our wet moors and mosses we would surely find some evidence in support of this theory if it were true. One of Mr. Tutt's correspondents apparently made this suggestion to him after the first portions of the paper had appeared, for he says (p. 21): "I have heard it suggested against this theory, that the insects from the marshes and similar situations are pale coloured, and, as instances, the *Leucanidæ* have been given, on the assumption, I presume, that all insects from such localities should be dark; but this does not appear to me to militate against the theory. I, fortunately, have been able to study the actual habits of the species of this family in a state of nature, and, as they sit head downwards, with their wings folded closely to the edges of the reeds on which they usually rest, the appearance they have, so closely resembles, the nodes on a reed culm, that it is barely possible for a trained eye to detect them, and we may be certain that the peculiar colour which is so advantageous in enabling them to escape their enemies and thus perpetuate their species, is as directly dependent on "Natural Selection" as is the darker assimilating colour of those species which rest on the ground, fences, or other dark objects."

But Mr. Tutt argues here from a special case, and assumes when he has replied to that, that the reply has a general application. The *Leucanidæ* are not the only fen frequenting Lepidoptera in which these pale colours predominate. *Macrogaster arundinis*, *Lœlia cænosa*, *Lithosia muscerda* may be cited among Bombyces, and they are of very different habits; *Collix sparsata*, the genus *Chilo* and many others may be named, all of these ochreous tints, which certainly is the prevailing hue in the species that inhabit our swamps and morasses. Even our solitary marsh butterfly *Cœnonympha davus* is nearly of the same hue. But more than that may be said, *Odonestis potatoria* is paler at Wicken than in any other locality than I am acquainted with, and a variety of the male occurs there occasionally, as pale as the female. But it appears to me that at this stage Mr. Tutt had either abandoned, or lost the thread of his argument, and that his opinion was changing, consciously, or more probably unconsciously, and he now imports another factor. He says (p. 22): "But with regard to the pale marsh frequenting genera, I have specimens that prove distinctly that even these species vary according to general humidity, *coupled with an area in which large quantities of smoke* are being produced, e.g. *Leucania impura* and *L. pallens* produce much darker specimens in the London marshes, than in the open fields near Strood in Kent, and Scotch specimens are occasionally darker still. Again, *Agrotis nigricans* is blacker from the Greenwich marshes than from the fields and marshes in the neighbourhood of Rochester. But *Leucania impura* and *pallens* have no right to be called "Marsh-frequenting species." They abound in dry places like our sand-hills at Hartlepool, and are so generally abundant that it is only in exceptional localities that they do not occur. But we must notice that it is *humidity plus smoke* which is supposed to make these darker in the London marshes than in the open fields of Kent, and does it not seem as if smoke had more to do with it than humidity, when he tells us in the next sentence, that *Agrotis nigricans* is darker in the marshes at Greenwich than in those near Rochester. As for this insect, I have taken it on our dry sand-hills at Hartlepool, quite as dark as the darkest in Mr. Tutt's lengthy series, and what is more, we never by any chance take a light coloured one.

With reference to this assumed change of view, it must be remembered that the earlier portion had been written a year or two before, and that as it had appeared, the question was being discussed in his correspondence, and he was extending his remarks and enlarging his views in consequence. But the clear and definite theory, that melanism was the result of the westerly winds charged with moisture from the Gulf Stream, is no longer put forward as the active agent it was assumed to be at first, but moisture is now spoken of as an indirect or secondary cause at most. Thus at p. 48 he refers again to swampy climates, and says: "But if moisture is to be taken as a direct, rather than an indirect cause, we should expect to find melanic variation occurring in the swamps of Tropical Africa, in the Forests of the Amazon, on the banks of the Mississippi, and in many other damp climates, even within tropical regions, and I am not aware that this is the case." And on the next page "Although I certainly look on moisture as an indirect rather than a direct cause of melanism." Still further to emphasize the point I wish to make, that the settled opinions of the earlier pages, were settled no longer, he writes on p. 49 "Lord Walsingham's idea as to the action of the actinic rays of the sun in producing colour, and the absorbtion of certain of these rays by clouds, &c., as a probable cause of melanism, is quite new to me," and after discussing this point, he says (p. 50): "Although I thus still venture to differ from Lord Walsingham, I must candidly confess that his remarks have modified my previously formed opinions, and that I should not now feel inclined to give the probable action of sunlight such short shrift as I gave it in a previous paragraph."

But though we find in this portion of the pamphlet an inclination to retreat from the very decided views enunciated at the beginning, he returns very much to his earlier opinion before he concludes. Letters from Mr. Smith, of Ashburton, New Zealand, Mr. Cockerell, and Dr. Chapman, are quoted in support of the moisture theory. It is not possible for me to quote the passages, and I am quite aware that I am laying myself open to the remark that what I do not reply to is left over because it is unanswerable, but I knew when I undertook to read this paper, that I could not possibly discuss every point at length. In reference to these letters quoted by Mr. Tutt, I will observe only that of Dr. Chapman, who is one of the most thoughtful and original of all students of Lepidoptera, does not support the idea that moisture produces melanism. His communication is a careful argument which, on the assumption that "dark colouration is advantageous to a species living in a damp and cold climate," shows how by natural selection such forms or species might increase proportionately to others in wet seasons. He says (p. 64): "We want really to know whether exposure to wet (or cold) *makes* dark varieties or only selects them. I do not know that evidence of it *making* them is yet very cogent."

I have now gone through those of the various suggestion that have been made in this subject during the last 50 years, which appeared to me to have an important bearing on the "Moisture producing Melanism" theory, my extracts and comments being of course limited by the time at my disposal. Though we are only at the beginning of the enquiry, we know enough now to show the direction in which we must search for the solution. Moisture does not afford it. Our swamps and fens not only give us no melanic forms, but the species that appear to be best fitted for these most humid localities are pale ochreous or light drab in colour. Even Mr. Tutt can only suggest a chance specimen or two, and these, though darker near smoky London, are not so in similar places in Kent. Now it is quite certain if it were moisture which made *Nigricans* black in Greenwich marshes, it ought to produce the same effect in Kent, and the insect ought to be light coloured on the dry sand-banks at Hartlepool. If the action of the Gulf Stream had the effect Mr. Tutt supposes, it might explain the permanent melanism of Ireland, the Isle of Man, and the North West of Scotland, but it cannot be assumed to explain that of Lancashire, Yorkshire, Durham, and various other similar places, it cannot explain the melanism of London, of Newcastle, and other large towns. For untold ages the Gulf Stream has been flowing as at present and warming our western shores. The westerly winds blowing from it across our islands were as charged with moisture ten thousand years ago as they are to-day. But these melanic forms did not exist half a century since, and it would be idle to assume that they had been brought into existence now by humidity which had failed in producing such an effect in all these thousands of years. In the earlier part of the paper (p. 17) ignoring "Natural Selection" and everything but humidity, Mr. Tutt tells us of the "startling suddenness with which many species, during the wet season of 1888, assumed a darker colour." Yet the humidity from the Gulf Stream, while assumed to produce melanic forms elsewhere, failed to affect the hues in Lancashire and Yorkshire till the present time. It does not appear to me that he has sufficiently considered the difference between what I may call the permanent melanism of parts of Scotland, of Ireland, and the Isle of Man, with that melanism which has sprung up around our large towns and in our manufacturing districts during our own time. Not so much a difference in the results produced, as in the circumstances under which they are produced. Can we find one condition common to all? Mr. Tutt says humidity, but it is abundantly evident that humidity is a condition which constantly exists without melanic forms. Lord Walsingham has suggested another to which I must now refer.

In dealing with the "Melanism of High Latitudes" Lord Walsingham showed how great an advantage it is for an insect to be dark coloured, under the conditions which obtain in such localities. Where frequent clouds and mists obscure the sun, the insect that by its hue, is enabled to take advantage of every passing gleam, will certainly, in the struggle for existence, compete favourably with those whose hues are less heat-absorbing, will perpetuate its race where they would fail, and transmit, by the laws of heredity, those characters to its offspring which had enabled it to fulfil the purpose of its existence. Though this address was directed to the melanism of High Latitudes only, before concluding it, he referred also to the melanism of our manufacturing districts and of the neighbourhood of our large towns. I have already quoted part of the passage, previous to which he said: "We should expect to find varieties tending to assume absorbent colouring not only in the Arctic and Alpine regions, where the amount of cloud and mist must greatly diminish the incidence of direct sunlight, but also under any conditions which would limit it in an artificial manner. Dr. J. Hann strongly insists upon the chemical energy and potentially of diffused sunlight; corroborating and supplementing Tyndall's observations to this effect." Here, in my opinion, is the true solution. Whatever obstructs the direct rays of the sun, will increase the tendency to melanism, and though various conditions may be found, the action is the same and the result is the same. Whether these direct rays are obstructed by cloud and mist in the North and in mountainous regions by the sunless skies of Ireland and the Isle of Man, or by the smoky pall that hangs over our great cities, and our manufacturing districts, the effect is the same. The sun's rays are obscured, and heat-absorbing colours are found on the wings of our Lepidoptera. Why Ireland and the Isle of Man are so sunless, I do not know. I have tried to think that the action of the Gulf Stream might produce such results, but Mr. Barrett's account of the pure blue sky and perfectly clear atmosphere at Pembroke, shows that it is not so. Besides, the effects of the Gulf Stream are not confined to the narrow limits given by Mr. Tutt, they extend over all our western and southern shores, and even to the coast of France. I leave the explanation for the meteorologists of Ireland. The facts we know are that the skies are comparatively sunless, and that melanism is a marked characteristic of the Lepidoptera.

In the manufacturing districts of the North of England the appearance of melanic forms there, exactly coincides with the great increase of factories, chemical works, blast furnaces, and such like smoke and fume producing places, which have been established during the last half century, and, as they have increased in number, so have two facts in connection with Lepidoptera become apparent. First, the more delicate species have become extinct, and Second, the more susceptible have become melanic. There is considerable difference to be observed in the susceptibility of different species. The first noticed in this country was *Amphydasis betularia*, and singularly enough, it has apparently been the first species to become melanic in the manufacturing districts of Germany. Red, green, and black, are the most heat-absorbing colours, and Lord Walsingham has proved that in black this applies to insects, and he has also shown that it is probably so with red. With reference to green it is somewhat singular that in my district *Polia chi* has become green under the clouds of smoke, whilst in the Yorkshire districts it tends towards black. *Eupithecia rectangulata* which is normally green, has under these smoky clouds of both London and Newcastle become quite black. There are many other apparent anomalies, thus, Irish male *Mendica* are not black, but nearly white, and the genus *Fidonia* is found to have a whiter ground colour in the North and a yellower in the South, and with the closely allied *Strenia clathrata* the same rule obtains. But no doubt all these apparent difficulties will be explained in due time; the chemistry of insect colours has scarcely been studied at all. At present we may confidently assert that whatever impedes the direct rays of the sun, has a tendency to create melanic forms in Lepidoptera.

THE PTEROPHORINA OF BRITAIN.

BY. J. W. TUTT, F.E.S.

(Continued from p. 58).

Leioptilus tephradactyla, Hb.—This species is also local in Britain, though it appears to be much more widely distributed than *lienigianus*, but less so than *osteodactyla*.

SYNONYMY—*Tephradactyla*, Hb., 17; Zell., 'Linn. Ent. Zeit.,' VI., 382; Ev. 'Fauna Volgo-Ural.,' 608; H.-S., 28, V., p. 380; Frey, 415; Tgstr. 'Anm.,' 200; Sta. 'Man.,' II., p. 443. This is one of those few species which appear to have no synonyms, but which has always been recognised by the name by which it is now known.

IMAGO—The fore-wings are divided into two lobes; the apex pointed; the colour greyish-ochreous, thickly mottled with blackish-grey scales, giving the wings a very suffused appearance; at the end of the cleft are two small blackish dots, that nearest the costa being rather larger; near the apex of the upper lobe are three black dots, and three on the margin of the lower lobe. The hind-wings greyish-ochreous. The perfect insect appears in June and July. Stainton's diagnosis of this species is:—"Fore-wings whitish, dusted with grey, with some black dots round the apex of the anterior lobe" ("Manual," Vol. II., p. 443). Mr. South writes:—"The imago of *L. tephradactyla* runs very close to that of *L. lienigianus* in structure and coloration, but the absence of the costal spots at once separates it from the latter species" ("Entomologist," Vol. XV., p. 106). Hübner's fig. 17 is the type and of this I made the following description:—"? Anterior wings dull ochreous-yellow, much sprinkled with black scales; a long white dot near the base, midway between the costa and inner margin; a small black spot on the lower side of the second lobe of the anterior wings, and two others on the first digit, one on the fissure, the other directly above it on the costa. Hind-wings unicolorous dark grey. Head, thorax, and abdomen of the same colour as the fore-wing." ("Sammlung europ. Schmet." &c., fig. 17). A figure of the moth, larva, and food plant appear at Vol. XV. of the "Entomologist," Vol. XV., figs. 4, 4*a*, 4*b*, 4*c*.

LARVA—The larva, which feeds on the leaves of *Solidago virgaurea*, is full-fed in May, and is of a grass-green colour, with the head yellowish, and with clearly defined tubercles from which several short hairs spring. Mr. Porritt gives a very full description of the larva and writes as follows:—"In May last year, and again in May of this year, Mr. W. H. Grigg of Bristol, kindly sent me larvæ of this species feeding on the leaves of the golden-rod. Length about half-an-inch, and of the usual shape characteristic of the genus, rather flattened ventrally, but roofed upwards from the spiracular region to the dorsal area, which is also rather flattened; head polished, about the same width as the second, but narrower than the third, segment; segmental divisions clearly defined; tubercles prominent, each of them emitting several short hairs, ground colour grass-green; the head pale yellow; there is an interrupted grey line along each side of the dorsal ridge, and a faint indication of a similarly coloured subdorsal line; tubercles greyish white, as are also the hairs; the segmental divisions yellowish. Ventral surface uniformly grass-green" ("Entomologist," Vol. XIV., p. 260). It is, I believe, quite uncertain yet whether *tephradactyla* hybernates like *osteodactyla* in the larval stage. Stainton writes in "The Entomologist's Annual," for 1856, p. 60:—"*Pterophorus tephradactylus*. Professor Frey finds the larva of this on *Solidago virgaurea* in May; I met with the *young* larvæ on that plant, at Clovelly, in September." In the "Manual," Vol. II., p. 443, the same author writes:—"Larva on golden-rod, IX—V.," based probably on the above observation. As, however, the larva of *osteodactyla* was not then known, I am inclined to think that the hybernating larvæ were those of the latter species, as *tephradactyla*, if it does hybernate, must be very minute in the autumn, but for all that, it may hybernate. Mr. Hodgkinson ("Entomologist's Monthly Magazine," Vol. XII., p. 13) questioned the hybernation of the larvæ and on recording the capture of young larvæ on May 2nd, 1875, at Witherslack, remarked that he had been told that that larvæ fed up in autumn in the South of England, his personal observation agreeing with that of Frey, whilst the latter remark evidently referred to the larvæ of *osteodactyla*. Mr. South writes:—"Young hybernated larvæ may be found as soon as the foodplant is above the ground eating the tender shoots, often three or four larvæ on one shoot. They are then about the size of a larva of *Arctia mendica* just emerged from the egg, and in colour whitish with long grey hairs" ("Entomologist," Vol. XV., p. 106). This is of course only an assumption of hybernation, and with the exception of Mr. Stainton's observation mentioned above, no one appears to have noted larvæ before or during hybernation.

Pupa—The pupa is similar to those of others of the group being of a greenish colour and attached by the anal segment to the food plant. A rather large supply of pupæ for which I was indebted to Mr. Batty of Sheffield, appeared to be considerably darker than others from Kent, although I did not have them side by side for comparison. It may be found during June. Of the pupa, Mr. Porritt writes:—"The pupa is attached by the anal segment to a stem or leaf of the food-plant, and, although there is no silken belt its position is not suspended, but flat along the stalk or leaf to which it may be attached. It is barely half-an-inch long, compact, and of moderate bulk; there is a distinct depression extending through the centre of the dorsal surface from the head to the anal segment; and the abdominal divisions, eye and leg cases are well defined. Ground colour dingy dull green; the sides thickly sprinkled with smoke-colour; there is also a smoky stripe through the wing-cases; the hairs grey. The imagines emerged early in June" ("Entomologist," Vol. XIV., p. 260). Mr. South also describes the pupa in the "Entomologist," Vol. XV., p. 106.

Habitat—This species is widely distributed and occurs in most places where *Solidago* abounds. It is recorded from the Isle of Skye, by Mr. C. W. Dale. It was captured at Conistone by Mr. E. M. Geldart ("Entomologist's Monthly Magazine," Vol. II., p. 184). Mr. Hodgkinson records the capture of young larvæ on the 2nd of May, 1875, at Witherslack, and remarks that he has been informed that the larva feeds up in autumn, in the South of England (*l.c.*, Vol. XII., p. 13). This, I think, may be entirely an error, as the larva is certainly very small in the spring, and probably refers to the larva of *osteodactyla* which does hybernate in the larval state almost full-fed. In the same Magazine (Vol. XXIV., p. 128), Dr. Jordan records the capture of the species at Eidsvold amongst *Solidago*, whilst Staudinger and Wocke give the following range:—"Central and Northern Europe (except the Polar region), Central and Eastern Russia" ("Catalog," p. 344). Stainton gives "Bristol, Manchester, and Pembury," as localities, whilst the Rev. Mr. Horton records it from North Devon and South Wales. It is very abundant in some years in Raindean Wood, near Folkestone. Mr. Porritt records it from "Witherslack, Abbots Wood, and Hailsham" *(in litt.)*. Mr. A. W. P. Cambridge writes:—"Common among *Solidago virgaureæ* in woods, but much scarcer of late years; none have been taken since 1887" *(in litt.)*.

Time of Appearance, &c.—The species occurs in June, and occurs abundantly in some years in many of our southern woods, and also in some of its more northern localities. Stainton gives "July" as its time of appearance; whilst Mr. Porritt gives "May and June" *(in litt.)*.

NATURALISTS OF THE DAY.

XV.—Rev. W. F. JOHNSON,

M.A., F.E.S.

Irishmen, as a rule, appear to have an inborn love for Natural History, and of recent years great progress has been made in the study. Besides the establishment of numerous local societies, we now have a magazine exclusively devoted to the furtherance of the various branches of Natural Science. In former times both Dean Swift and Oliver Goldsmith, and especially the latter, by their frequent references, showed themselves to be keen observers of Nature. Goldsmith was the author of a book entitled, "Animated Nature"—a work of no scientific value, it is true, yet ample evidence of his leaning to Natural History.

Of scientists proper, Haliday may perhaps be quoted as of the front rank; but, coming to our own times, the Rev. W. F. Johnson, of Armagh, has done far more for the study in the sister isle than any one of the present day. To this gentleman's courtesy we are indebted for the portrait now presented to our readers.

The Rev. W. F. Johnson was born at Travancore, South India, in 1852; his father being in the service of the Church Missionary Society at that time. He was educated privately, and matriculated in Trinity College in 1872. In August of the same year he became Assistant Master of Armagh Royal School, retaining this appointment until January, 1881.

REV. W. F. JOHNSON,

M.A. F.E.S.

President of the Armagh Natural History and Philosophical Society.

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Mr. Johnson graduated as B.A. in December, 1876, and as M.A. in April, 1880; taking Holy Orders in 1879, and was ordained on Trinity Sunday of that year by the present primate, the Bishop of Down.

In 1881 Mr. Johnson's services were transferred to Armagh Cathedral Grammar School, as principal—which important position he now occupies. Shortly afterwards Mr. Johnson was appointed Junior Vicar Choral of Armagh Cathedral, and in January, 1882, he became Senior Vicar Choral; this office, we may explain, corresponds to that of Minor Canon in our English Cathedrals.

Mr. Johnson appears to have taken up the study of Entomology early in life, as he tells us that in 1863, he commenced the collecting of Lepidoptera. The only living specimen of *Colias edusa* ever seen at Armagh was captured in 1877. It appeared in the cricket field while a match was proceeding. We give Mr. Johnson's account of what took place:—" I had just finished bowling the over when I saw *Edusa* going at full speed across the field. Fortunately I had my net with me; I seized it, and set off at top speed after the butterfly. I overtook it at the summit of a hill which rises from the cricket field, when away it went at right angles, after the manner of *Edusa*. However, I knew this little trick, so was after it at once. Close by was the road, for which it was making straight. If it got across, I knew I should be pretty well done, for the road was below the level of the fields on either side; I should have a drop on one side and a climb over eight-foot walls on the other. I therefore put on a tremendous spurt and came up with it just at the road. I struck at and caught it, but, missing my footing, rolled headlong into a ditch of nettles, amid loud applause from the school boys. The most curious thing in the whole proceeding was that the net was not injured, nor the butterfly damaged, neither was I stung by the nettles."

In 1884 he turned his attention to Coleoptera, Hemiptera, and other Orders. In collecting Coleoptera Mr. Johnson has added a considerable number of new species to the Irish list, and his efforts in this direction are the more meritorious inasmuch that he has to work almost alone, having no public collection wherewith to refer for the purpose of identifying his captures. We must not omit to mention that Mrs. Johnson also renders him very able assistance in the study.

As an ardent and untiring collector of Coleoptera Mr. Johnson cannot be excelled, and during winter he frequently takes long walks for the purpose of procuring species found in moss. He recently wrote us:—" I have trudged seven miles to-day and brought home a large bag full of moss, in the home of getting some more *Pselaphus Dresdensis* for my friends, but I have not been successful. I suppose the weather is too cold. However, I shall go again as soon as I get time." During a visit to Donegal last year, Mr. Johnson succeeded in capturing what may prove to be either a species of *Cneorhinus* new to Britain, or a very interesting variety of *C. exaratus.*

Mr. Johnson's first essay in Entomological literature is contained in Vol. XXII. (1883) of the "Entomologist's Monthly Magazine," a periodical to which he has frequently contributed ever since. Notes from his pen have likewise appeared in our own pages, the "Entomologists' Record," and the "Irish Naturalist." He is the author of papers entitled "Irish Geodephaga" and "Irish Staphylinidæ," read at the South London Society.

In October, 1888, he read a paper on "Irish Insects," before the Belfast Natural History and Philosophical Society; and in January, 1892, a paper on "The Beetles of the Belfast District," before the Belfast Naturalists' Field Club.

His connection with the Armagh Natural History and Philosophical Society commenced in 1872, and at the present day he is the President of that Society. The most important papers read at their meetings are on "Irish Lepidoptera," "Irish Coleoptera," and "British Lamellicorn Coleoptera." He is likewise a member of the Belfast Naturalists' Field Club, and the Entomological Society of London.

A paper on "Irish Coleoptera" is also promised to the City of London Entomological and Natural History Society. The latter Society are much indebted to Mr. Johnson for his kind assistance of specimens for their collection of Coleoptera.

The most important of Mr. Johnson's papers is that on "The Coleoptera of the Armagh District." The species enumerated, we gather from the "Irish Naturalist," were all captured by himself, with Mrs. Johnson's assistance, except a few picked up by some of his pupils and brought to him. This is the largest list of Irish Coleoptera yet published, numbering upwards of 700 species. Mr. Haliday's list, published in 1885, contained 528 species. The Dublin list of 1878, comprised 623 species. Mr. Johnson's list contains some 250 or more species which do not appear to have been recorded from elsewhere in Ireland. This is because Mr. Johnson has been steadily working all the year round since 1884, while other districts have been comparatively neglected. However, this state of affairs will, perhaps, be remedied now, especially as Messrs. Cuthbert and Brown, of Dublin, have both been putting in good work during the last two years. Other Coleopterists have also been started, and, practically assisted by Mr. Johnson, we hope to hear of good things of them in the future.

In concluding, we may add that Mr. Johnson rendered very able assistance with Irish localities, &c., for the compilation of Canon

Fowler's work on "The Coleoptera of the British Isles," and, in acknowledging this service, the author states that "the Rev. W. F. Johnson is doing good work at the Irish Coleoptera."

LITHOCOLLETES CERASICOLLA.

BY H. H. CORBETT.

A SPECIES NEW TO THE BRITISH FAUNA, AT DONCASTER.—I have pleasure in adding the above species to the British list. Last autumn I collected the mines of the larva in the leaves of *Prunus avium*, and I have now bred a few of the imagines. One of the latter I have sent to Mr. Barrett, who confirms my opinion, that it is undoubtedly *Lith. cerasicolella* (Her-Schäff). Appended is a description of the mine, the larva, and the imago.

The mine is elongate and is placed between the lateral veins of the leaf of *P. avium*, reaching from near the mid-rib towards the margin.

The larva is pale yellow, second segment orange yellow; head dark brown or black; legs grey.

The imago belongs to the *Pomifoliella* group, and is like *Spinicolella*, but the following points serve to distinguish it from that species.

The first dorsal streak is more gradually curved and its apex does not point in a line continuous with the basal line. The third dorsal streak is very small, and never joined to the third costal streak. The third and fourth costal streaks are united by some white scales above the sub-apical black spot.

19, Hallgate, Doncaster.

SUGARING:

A PROPOSAL FOR UNITED OBSERVATION.

BY JOHN E. ROBSON, F.E.S.

One of the most puzzling phenomena in connection with the collection of Lepidoptera is the extraordinary manner in which insects come to "sugar." One season will give excellent results everywhere, another scarcely produces an insect. One night the sweetened bait will be covered with moths, the next, we spread it altogether in vain. Sometimes, as if by signal, the moths, that are feeding too eagerly to heed the glare of the collectors' lantern, will suddenly raise their wings and take flight. Another peculiarity to be noticed, is that one species will perhaps swarm at the sugar for one or more evenings and at no other time, thus *X. lithoxylea* visited my bait in considerable numbers one night last year, but not a solitary specimen appeared on any other evening. So, too, on certain nights, black, or very dark *X. polyodon* were present with the common form, and on others only the type appeared. In a good "sugar" season, species will appear which we had never seen before in the district, and in fact I might refer to similiar anomalies to almost any extent. What is the reason of it? No one has the slightest idea, though we are generally disposed to attribute it to meteorological conditions. It is quite certain that we will never by individual effort only, be able to understand the causes which produce these results, but if a series of systematic observations were made in various places, and carefully compared together, we might be able to discover some of the conditions which give us good or bad results. For this purpose I have had some forms prepared and printed for the use of sugarers, and will be glad to supply any one who will use them. The meteorological observations to be made are quite ordinary, filling up the sheet will not take many minutes, and if they are forwarded to me once a month, little trouble will be entailed, while the results may happen to be of great value. I purpose to publish from time to time any extracts that may appear to be of interest, and I have great faith that if a sufficient number of observers take the matter up, important results will follow. Special value will attach to a series of observations at one locality, but solitary sugarings will compare equally well with others, and the smallest help will aid in the investigation. I will forward any number of printed forms, free, to any collector who will undertake to fill them up and return them. For convenience of comparison, I would particularly request that a separate form be used each night. Where not too late, I would be glad to have observations on "Sallow" collecting in the same way.

Notes.

Colias edusa.—It may be of slight interest to record that I bred *Colias edusa* on 1st February. On the 16th September, I obtained about 60 ova, the young larvæ duly emerged, but as the frosty nights came on, they died off, although kept in a window facing the south, with a fire occasionally in the room. Three, however, struggled on and became pupæ, the first on the 26th November, the other later on, but ultimately damped off.—G. C. Bignell, Stonehouse, Plymouth, 2nd February, 1893.

Breeding Bombyx rubi.—I have to acknowledge the usefulness of some hints you gave me some time ago on rearing larvæ of *B. rubi*. I got 33 larvæ at Castle Eden, and, as my last attempt at forcing was not very successful, I let them hibernate. I put them in a large box half full of sand, with various plants, and put them in a cold place in the garden. In the middle of January I grubbed them all out and was pleased to find them healthy and in good order. Most of them I put singly into chip boxes as per your recipe, the others into a flower pot with moss. Both lots did well, and I obtained 29 pupæ, 25 of which are now out. I am, however, puzzled at the extraordinary preponderance of females, viz.: 20 out of the 25. In price lists these are charged half as much again as males, and I expected that proportion to be maintained. I did not take only the largest larvæ, but all I saw. Most of them are very large, but a few are small and dark. I noticed those that spun in the chip boxes made much lighter cocoons than those spun among the moss, though it must have been much darker for them.—L. S. BRADY, Sunderland.

VARIATION OF EREBIA BLANDINA.—Mr. Barrett refers in his new work, to the little variation *E. blandina* is subject to. I have one which seems to vary more than any he describes. In the fore-wings the red band does not extend below the middle, and barely contains the usual two white centered spots. The hind-wings have no red band, but three very small red marks, occupying the position and about the size of the ordinary ocelli, which are entirely absent.—L. S. BRADY, Sunderland.

THE ACULEATE-HYMENOPTERA OF BRITAIN.—Our readers will be interested to know, that Mr. Edward Saunders, F.L.S., F.E.S., &c., the chief authority in Britain on this group, and author of the "Synopsis," which has hitherto been the text book on the subject, is writing an important work for Messrs. Lowell, Reeve & Co., on the same lines as Canon Fowler's exhaustive work on British Coleoptera. We are informed that the chief difficulty he has to contend with is the want of reliable records of localities where the various British species occur, and that he is much pleased with, and is making a large use of, the Lancashire and Cheshire list lately published in these pages.

THE FOOD OF YOUNG SPIDERS.—Young spiders in *confinement*, even though plentifully supplied with atmospheric food, viz., water, have a strong tendency to cannibalism. But, whether in a wild state, they catch and eat those of their brothers and sisters who are not so fit to survive, I cannot say; but should think probably *not*.

It is well known, of course, that the females of the *Lycosidæ* bear their young upon their backs for a considerable time, presumably until they are capable of shifting for themselves.

I believe I have seen it stated somewhere that the young ones eventually overpower and eat their mother. This would not be at all improbable but will require some amount of confirmation before it becomes an accepted article of my creed.

The facts related by Mr. Sanborn concerning the 'milk' and its absorbtion by the young Lycosas are very interesting, not to say startling. He will probably be aware that the natural excretal fluid, white with solid black particles, issues from the anal orifice situated immediately above the spinnerets. Most of the females with young which have come under my observation, were rather shrivelled up than otherwise.

As to the food of the young of other spiders I cannot speak with any certainty either, though I can affirm that they are capable of capturing small flies, etc., at a very early age.—F.O.P.C.

THE IVORY GULL AT HARTLEPOOL.—A fine specimen of this rare gull was brought me to-day for identification. It was shot by Mr. R. Loughborough on the North Sands on the 21st January, and is now in the possession of Mr. Jas. Pounder.—JOHN E. ROBSON, Hartlepool.

Mollusca.

NOTES ON THE VARIATION OF SOME NORTH AMERICAN MOLLUSCA.

BY T. D. A. COCKERELL, F.Z.S., F.E.S., ETC.

I have had the following notes in MS. for about three years, together with others which are still held back. No systematic attempt has yet been made in North America to describe and catalogue the mutations of the land shells, owing to the general impression that this is not worth doing; but I suppose the matter will receive attention later on, when there are no more new species to look for. Four of the species treated of below are only aliens in North America.

Agriolimax agrestis form *varians* Westerlund. Mr. H. F. Wickham sent me this from Portland, Oregon. It was pale grey, with heavy black mottling coalescing on the mantle.

A. agrestis form *succineus* Westerlund. Portland, Oregon. (H. F. Wickham). The specimen is reddish-ochre above, with a faint indication of grey marbling on the mantle.

A. agrestis form *sylvaticus* Moq. I have received several specimens both from Portland, Oregon (H. F. Wickham), and Houston, Texas (W. W. Westgate). I also received one example from Dr. Cooper, collected about 16 miles south of Haywards, Cal.

Zonites internus form (Animalis) *pallidus*. The animal cream-colour. Binney, Man. Amer. Land Shells, p. 230.

This cream-coloured (i.e. unpigmented) condition of the soft parts is very interesting, the more so because it is usually *not* coincident with the pigmentless condition of the shell. A freshwater species, *Physa fontinalis*, has a similar variety (which may be called *flava*) in which the animal is yellow, with the pink buccal mass showing through the transparent tissues. This variety was found by Messrs. F. G. Fenn and S. C. Cockerell at Herne Bay, in England, and I had the opportunity of seeing living examples. The white variety of the shell of *P. fontinalis* also occurs at Herne Bay, but, as in the case of the *Zonites*, it is not coincident with the pigmentless animal. Finally, *Limnœa palustris* var. *flava* Pascal (Mém. Soc. Lin. du Nord de la France) is a third variety in which the animal is unpigmented.

Z. cupreus, Raf. This name has priority over *fuliginosus*, and should be adopted.

Z. cupreus form *sinistrorsus*. Shell reversed. Man. Amer. Land Shells, p. 208.

Z. indentatus var. *umbilicatus*, Singley, n. var. Mr. Singley has kindly sent me this from Lee Co., Texas. It is the form figured in Man. Amer. Land Shells, fig. 17.

Z. petrophilus form *sinistrorsus*. Shell reversed. Toccoa Falls, Ga. (Hemphill). Man. Amer. Land Shells, p. 478.

Patula convexior, Ancey. Mr. Ancey has kindly sent me a description and figure of his *ingersolli* var. *convexior*, which he now regards as a distinct species. *P. convexior* has the spire distinctly convex, and the aperture broader and less lunate. The last whorl is more depressed. Certainly *convexior* would appear to be distinct, but Mr. J. H. Thomson submitted to me 13 specimens collected by J. D. Putnam at Summit Canon, Mt. Nebo, Utah, which are apparently referred to *convexior* by Mr. Ancey, and I was not able to distinguish them from Colorada examples, except that they seemed a little square viewed laterally. These specimens, Mr. Thomson informs me, were seen by Mr. Ancey, and in the MSS. Mr. Ancey kindly sent to me Mt. Nebo is given as a locality for *convexior*.

Patula alternata form *alba*, B. Walker (sine descr.) Journ. of Conch, 1879. Shell white. Michigan (Walker), see also Man. Amer. Land Shells, p. 481.

P. alternata form *sinistrorsa*. Shell reversed. Man. Amer. Land Shells, p. 257.

P. strigosa form *sinistrorsa*. Shell reversed. Provo, Utah. (Hemphill). Man. Amer. Land Shells, p. 481.

Helix hortensis form *minor*, Moq. I received from Mr. J. H. Thomson 21 examples of var. *lutea* from Gay Head, I. of Martha's Vineyard, Mass. They are perfectly uniform in colour, being all yellow and bandless—I never saw such uniformity in the species in any other locality. They are smallish, and one example, having max. diam. 17 mill., may be referred to var. *minor*.

H. nemoralis form *hybrida*, Poiret. I include this in the list, as Prof. Morrison informs me he has found forms referable to *roseolabiata-bimarginata* of two different band-formulæ at Lexington. *Hybrida* may be considered to include all those shells in which the lip is pale (pinkish or brownish) instead of black.

H. nemoralis form *nilssonia*, Moq.=*libellula* (123)45. Lexington, Va. (Prof. J. H. Morrison *in litt.* Nov. 16, 1889).

H. nemoralis var. *major*, Fér. Shell larger. Two sent by Prof. Morrison from Lexington, with max. diam. 28½ and 26¾ mill. respectively.

H. nemoralis form *albescens*, Moq. Prof. Morrison sent a shell from Lexington which may be referred here, being very pale yellow, like var. *subalbida* Locard of *H. hortensis*.

H. nemoralis form *richardia*, Moq.=*petiveria* (12345). Lexington, Va. (J. H. Morrison).

H. appressa form *sinistrorsa.* Shell reversed. Man. Amer. Land Shells, p. 288.

H. albolabris form *alba*. Clear greenish-white. Toronto, Canada (D. B. Cockerell). I received one specimen of this pretty variety, max. diam. 28 mill., from my brother.

Stenogyra decollata. In Man. Amer. Land Shells, p. 458, the non-existence of a specimen of mature age with an entire spire is commented upon. Certainly such is exceeding rare, but a form *integra* Ancey has been recorded, with an entire spire of about 12 whorls. This, however, is not American.

AN ADDITION TO THE FRESH-WATER MOLLUSCA OF THE BRITISH ISLANDS.—*Planorbis riparius*, West. An announcement appears in the "Irish Naturalist" of the discovery of the above species by Mr. J. N. Milne at Inch, near the shore of Lough Swilly. Dr. R. F. Scharff, by whom it was identified, tells us that it was recorded from North Germany, Sweden, and Siberia. He describes the shell as follows: "Shell very much flattened, finely striated, three to three and a half whorls, all whorls being visible; breadth 3—3½ mm. Its very wide umbilicus distinguishes it at once from *Pl. fontanus* and *Pl. nitidus*. In general appearance, indeed, it is more like a large *Pl. crista* L., but there is no trace of the ridges on the whorls which are so characteristic of that species."

A SLUG PLAGUE IN JAMAICA.—Mr. T. D. A. Cockerell has sent us a copy of a very interesting article which he has written on the above subject. It appears that the coffee trees are this year being greatly damaged by the ravages of a slug—*Veronicella sloanii*, Cuvier—which has not appeared in such numbers for something like twenty years. The planters find that the best plan of reducing the numbers of this pest is to plant bananas among the trees, these being a favourite food of this species, are carefully searched, &c. The slugs when adult are above three inches in length, and about an inch and a quarter broad, sole much narrower than the body. The typical form is white or whitish, but these now under consideration are dark brown obscurely mottled with darker brown above; white, more or less tinged with yellow below. Mr. Cockerell proposes for this form the varietal name *coffeæ*.

Notes.

We quote the following from the "Nautilus," whose editor culled it from a daily paper in the States. It is too great a gem of the average journalistic science to be lost:—"It is generally supposed to be a sign of wet weather when snails go about without their shells. One species of snail never takes its walks abroad except when rain is at hand. Some climb trees two days before a down-fall, settling upon the upper-side of the leaves, if a storm is to be of short duration, but taking shelter on the under-side if it is to last some time. Still other snails turn yellow before rain, and blue when it is over."

Mr. Sykes has an interesting paper in the "Proceedings Dorset Natural History and Amateur Field Club" for 1892, on some monstrosities of *Littorina rudis*, all more or less scalariform, which he is inclined to attribute to growths of weed in the suture of the shell, while the building is still in progress. A peculiarity of some of these shells is that they appear at first to be sinistral, and it is only on close examination that one finds them to be dextral with the last whorl bent upwards right above the spire. The *Littorinas* in question came from drift in the Fleet near Weymouth, and belong to the var. *tenebrosa*. I was fortunate enough to find a small genuinely reversed specimen there about 4 years ago. Very few of our marine species have occurred with the spire reversed. Besides this one, *L littorea* has several times been procured from Billingsgate market in this state. The best known shell however which "reverses" (to borrow a dancing term) is *Buccinum undatum*—a species subject to many "sports"—and it is moveover not so very uncommon. Most of the specimens come from the fish dealers. Its congener, *Fusus antiquus*, is very scarce reversed, though this is well known to be the usual form in the Red Crag, where dextral specimens are quite a rarity. No explanation seems to have been offered of this curious alteration from a sinistral to a dextral state of normal growth. We can, of couse, find somewhat parallel cases at the present day, e.g., in the genera *Partula*, *Achatinella*, or *Amphidromus*, where the two states frequently exist side by side in what are undoubtedly shells of one species, but there is here no sign of a transition from the sinistral to the dextral (or *vice versa*) in progress, nor does the parallel hold as to the relative abundance of the two varieties in a given species, as we believe in all such recent cases the two occur in about equal numbers. *Achatinella virgulata* and *Amphidromus perversus (citrinus)* are typical cases in question. Continuing the list of our marine shells which have occurred reversed, we must chronicle the probably unique monstrosity of a sinistral *Fusus gracilis* in Mr. H. K. Jordan's collection, from the west coast. Dr. Jeffreys dredged a sinistral *Natica catena*, off Guernsey, and *Purpura lapillus* fell to the lot of Bean at Scarborough in a similar state and by a curious accident as told in *"British Conchology." This gives a total of but seven species out of the whole marine list—a small percentage when compared with the 18 or 20 terrestrial species known to have occurred reversed.—BROCKTON TOMLIN, Llandaff.

Reports of Societies.

ENTOMOLOGICAL SOCIETY OF LONDON.

March 8th, 1893.—Henry John Elwes, Esq., F.L.S., F.Z.S., President, in the chair. Mr. Frank E. Beddard, M.A., F.R.S., of the Zoologist Gardens, Regent's Park, N.W.; Monsieur Edouard Brabant, of Château de Morenchies, Cambrai, France; Mr. Frank Bromilow, of Avalon, St. Maurice, Nice, France; Mr. Henry Powys Greenwood, F.L.S., of Harnham Cliff, near Salisbury; Mr. Frederick Michael Halford, of 6, Pembridge Place, W.; Lieutenant-Colonel Leonard Howard L. Irby, F.L.S., of 41, Cornwall Terrace, Regent's Park, N.W.; Mr. Bertram S. Ogle, of Steeple Acton, Oxfordshire; Herr Wilhelm Paulcke, of 33, Langstrasse, Baden-Baden, Germany; Mr. Louis B. Prout, of 12, Greenwood Road, Dalston, N.E.; and Captain Savile G. Reed, late R.E., of Foyle House, Alton, Hants, were elected Fellows of the Society; and Herr Pastor Wallengren, of Farhult, bei Höganäs, Sweden, and Herr Hofrath Dr. Carl Brunner Von-Wattenwyl. of Vienna, were elected Honorary Fellows of the Society to fill the vacancies in the list of Honorary Fellows caused by the deaths of Professor Hermann C. C. Burmeister and Dr. Carl August Dohrn. Dr. D. Sharp exhibited a species of *Enoplotrupes* from Siam, which was believed to be new, and which he thought Mr. Lewis intended to describe under the name of *E. principalis*. This insect has great power of making a noise, and the female seemed in this respect to surpass the male. Mr. W. F. H. Blandford said he wished to supplement the remarks which he made at the meeting of the Society on the 8th of February last ou the larva of *Rhynchophorus*. He stated that he had since found that only the first seven pairs of abdominal stigmata were rudimentary. The posterior pair were well developed and displaced on to the dorsum of their segment, which was thickly chitinised, and bore a deep depression, on the margins of which the spiracles were situated. He suggested that the absence of lateral spiracles was perhaps correlated with the wetness of the larval burrows, and that it was a displacement of the posterior stigmata, usually supposed to be restricted to aquatic coleopterous larvæ. He added that dissection showed that the posterior pair were the principal agents of respiration. Dr. Sharp and Mr. Champion made some remarks on the subject. Mr. W. H. B. Fletcher exhibited a

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* Jeff. B.C. IV. 278.

long series of bred *Zygæna loniceræ* and *Z. trifolii*, hybrids of the first generation with the following parentage:—*Z. loniceræ*, male—*Z. trifolii*, female; *Z. trifolii*, male—*Z. loniceræ*, female; also hybrids of the second generation between *Z. trifolii*—hybrid, and *Z. loniceræ*—hybrid. The President enquired whether the hybrids were robust and healthy or the reverse. Mr. Fletcher stated that many of the hybrids were larger than the parent species, and that some hybrids between *Z. loniceræ* and *Z. filipendulæ* were the largest he had ever seen. He added that *Zygæna meliloti* would not hybridise with *Z. loniceræ*, *Z. trifolii*, or *Z. filipendulæ*. Mr. Barrett and Mr. Tutt continued the discussion. Mr. F. W. Frohawk exhibited a bred series of *Vanessa atalanta*, showing the amount of variation in the red band on the fore-wings of the female. In seven specimens there was a white spot on this band, and in ten specimens it was absent. Mr. Elwes exhibited a large number of specimens of *Chrysophanus phlæas* from various places in Europe, Asia, and North America, with the object of showing that the species is scarcely affected by variations of temperature, which was contrary to the opinion expressed by Mr. Merrifield in his recent paper "On the effects of temperature in the pupal stage on colouring," &c. Mr. McLachlan, Mr. A. J. Chitty, Mr. Bethune-Baker, Mr. Tutt, Mr. Barrett, and Mr. Frohawk took part in the discussion which ensued. Dr. Sharp read a paper entitled "On Stridulating Ants." He said that examination revealed the existence in ants of the most perfect stridulating or sound-producing organs yet discovered in insects, which are situated on the 2nd and 3rd segments of the abdomen of certain species. He was of opinion that the structures which Sir John Lubbock thought might be stridulating organs in *Lasius flavus* were not really such, but merely a portion of the general sculpture of the surface. Dr. Sharp said that the sounds produced were of the greatest delicacy, and Mr. Goss had been in communication with Mr. W. H. Preece, F.R.S., with the view of ascertaining whether the microphone would assist the human ear in the detection of sounds produced by ants. Mr. Preece had stated that the microphone did not magnify, but merely reproduced sound, and that the the only sounds made by ants which he had been able to detect by means of the instrument were due to the mechanical disturbance produced by the motion of the insects over the microphone. A long discussion ensued, in which the President, Canon Fowler, and Messrs. Champion, McLachlan, Goss, Hampson, Barrett, Jacoby, and others took part, Mr. C. J. Gahan read a paper entitled "Notes on the Longicornia of Australia and Tasmania, Part I.; including a list of the species collected by Mr. J. J. Walker, R.N., and descriptions of new forms.—H. Goss and W. W. Fowler, *Hon. Secretaries.*

CITY OF LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY.

Tuesday, March 7th, 1893.—Exhibits. Dr. Sequeira, *Anisopteryx æscularia* and *Hybernia leucophearia*, taken that day in Victoria Park. Mr. Battley, a living specimen of *Nyssia hispidaria* from Epping Forest; also fossil shells from the Red Crag at Felixstowe. He remarked that the spiral shells from this deposit were often curled the opposite way to modern forms. Mr. Riches, variable specimens of *Helix virgata*, *H. ericetorum*, *H. cantiana*, *H. hortensis*, *H. nemoralis* and *H. aspersa*. Mr. Soul, fine specimens of the Paper Nautilus *(Argonauta argo)* and Pearly Nautilus *(Nautilus pompilius)*. Mr. Clark, shells of the Swan Mussel *(Anodonta)*. Mr. Rosevear, various shells to illustrate his paper. Mr. Bellamy, stuffed specimens of the Kestrel and Waxwing, both from Yorkshire. Mr. Rosevear then read his paper on "Conchology." He claimed the advantages of this science over Entomology, in that it was independent of the weather and season, that shells required but little preparation for the cabinet, and that there was no fear of their being destroyed by mites or mildew. He then passed on to consider the life history, habits and structure of the Mollusca, and concluded by referring to the recently established Malachological Society of London. Mr. Lewcock, in proposing a vote of thanks to Mr. Rosevear, mentioned that the larvæ of *Hydrophilus piceus* feed on young water snails. Dr. Buckell seconded the vote of thanks, and it was carried unanimously. Mr. Riches stated that he had observed *Biston hirtaria* on March 3rd. Mr. Lewcock also recorded this species. Mr. Battley stated that the sallow was nearly in bloom, some of the sheltered bushes being fully out.

Tuesday, March 21st, 1893.—Exhibits. Mr. Clark, *Nyssia hispidaria, Phigalia pilosaria*, &c., from Chingford. Mr. Hollis, *Phigalia pilosaria, Hybernia leucophearia*, and *H. progemmaria* from Highgate, two of the females of the latter being the melanic form. Mr. Riches, a variable series of *Hybernia leucophearia* from Richmond. Mr. Huckett, suffused forms of *Hybernia progemmaria* bred from Epping Forest larvæ. Mr. Battley, short series of *Procris statices, P. geryon*, and *P. globulariæ*. Mr. Tremayne, *Leucania turca, Hyria auroraria* and many others from the New Forest. Mr. Prout, series of *Gnophus obscurata* taken on the greensand at Sandown, and chalk at Ventnor. He remarked that although these localities were only a few miles apart, the specimens responded to their environments, the Sandown forms being decidedly the darker. Dr. Sequeira, *Cymatophora ridens*, bred from New Forest larvæ. Coleoptera —Mr. Heasler, *Haploenemus impressus, Scaphidema ænea, Rhinosimus viridipennis, Scydmænus horticollis*, and *Euthia scydmænoides*, all from Acton. Mr. Jarvis, *Plinthus caliginosus, Homalota plana, Prognatha quadricorne*, and *Platyderus ruficollis*, from Wandsworth and Darenth. Dr. Buckell then read his paper on "Specific Nomenclature, present, past and future." After an exhaustive review of the entomological writers since the time of Linnæus, he expressed his opinion that the time had now come to settle the nomenclature of our Lepidoptera, and that this could only be accomplished by an international arrangement with other countries. Mr. Lewcock proposed a vote of thanks to Dr. Buckell for his paper. Mr. Tutt, in seconding this, remarked that Great Britain was the only country that did not support a State Entomologist, most of the Continental countries, as well as the United States, Canada, and Australia having a regular staff of working entomologists, constantly engaged in carrying out experiments. He also stated, that although disagreeing with Dr. Buckell on a few minor points, he regarded his paper as of great value, as it condensed all the present knowledge on the subject. Messrs. Tremayne, Jarvis, Newbery, Prout, and others continued the discussion, and the vote of thanks was unanimously carried.

THE SOUTH LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY.

February 23rd, 1893.—J. Jenner Weir, Esq., F.Z.S., President, in the chair. Mr. S. Edwards exhibited a box of exotic Lepidoptera (butterflies), illustrative of mimicry from widely different localities. Mr. South, series of *Cerostoma radiatella* and *C. costella*, and remarked on the number of varieties of *radiatella*. Mr. Barrett drew attention to a method of transferring the scales of the wings of Lepidoptera to paper, as exemplified by a sample from Herr Aug. Hoffmann, and Mr. Tugwell noticed that the scales were necessarily reversed, and the body, eyes, antennæ, &c., painted in. Mr. McArthur shewed a method of steadying and securing an insect, by means of a slip of paper doubled over, when, for any reason, the pin through the thorax had been rendered useless. Mr. R. Adkin exhibited a short series of *Spilosoma mendica*, bred from larvæ found in Aberdeenshire, the males being of a brownish colour. Mr. Tugwell referred to the fact that specimens of the male *S. mendica*, from Barnsley, were light, whereas those from Huddersfield were dark forms, as exhibited recently by Mr. G. T. Porritt. Mr. Billups some curious forms of Hemiptera, Homoptera, Hymenoptera, Neuroptera, Orthoptera, &c., from a mission station on the Demerara River, British Guiana, and called attention to a fungoid growth attached to a specimen shewn, belonging to the Homoptera. Mr. Billups said it closely resembled, if it was not the actual species known as *Torrubia robertsii*, which attacks certain larvæ in New Zealand. Mr. J. Jenner Weir exhibited specimens of Euplosine butterflies from three distinct groups, viz.: *Crastia core*, *Narmada corevides*, and *Pademma kollari*, and read an interesting paper on "Isochromatous Lepidoptera." Mr. R. Adkin also exhibited a series of *Diurnea fagella*, from Lewisham, and mentioned several species, notably *Eupithecia rectangulata* and *Miana strigilis*, which had assumed a marked tendency towards melanism in the London District of late years, agreeing with Mr. Mansbridge that climatic conditions did not appear to account for the change. A discussion ensued, in which Messrs. Barrett, McArthur, Tutt, Mr. Robson, of Hartlepool, a visitor, and others took part. The President then called on Mr. Robson, who exhibited a short series of *S. mendica*, of which one specimen, a female bred at Hartlepool, was of a distinct cream colour. Mr. Robson stated that this species was common in Northumberland and Durham along the coast, and that the male insect occasionally varied to a colour intermediate between the English and Irish forms. Mr. Robson also exhibited dark specimens of *S. populi* L. from Aberdeen, and light forms (female) bred at Hartlepool. A discussion followed, Mr. R. Adkin stating that *S. mendica* was not a common species in Scotland, and Mr. Tutt and Mr. J. A. Clark each noticing varieties of the species.

March 9th, 1893.—J. Jenner Weir, Esq., F.Z.S., President, in the chair. The President exhibited specimens of *Diurnea fagella*, taken 50 years ago near London, and Mr. R. Adkin remarked that they were as light as any now taken in the metropolitan district. Mr. Jenner Weir also noted the capture of *Vanessa io*, by his brother on 19th February, near Sevenoaks, and that he had seen *Gonepteryx rhamni*, on the wing on 9th March. Mr. Fenn reported *G. rhamni* as having been common near Leatherhead, at the end of February. A discussion arose as to the occurrence of *Polyommatus dispar*, at Camberwell fifty years ago, and Mr. Fenn and Mr. Tugwell both recorded Kentish specimens previous to 1848. Mr. Tutt confirmed the capture of *Melanippe galiata*, near Huddersfield, as recorded by Mr. Mansbridge in his paper read before the Society on February 9th. Mr. R. Adkin exhibited for Mr. C. H. Watson a specimen of *Pieris brassicæ*, which approached very nearly *Pieris cheiranthi* of the Canary Islands. The specimen, a female, was bred from larvæ found in a garden at Streatham. Also two specimens, females, of *Apatura iris*, bred from larvæ taken in the New Forest in the autumn of 1891. Mr. G. B. Routledge exhibited a small collection of butterflies from Algiers, Hyeras, and Switzerland, including *Pararge ægeria* (types), *Limenitis camilla*, and *Polyommatus virgaureæ* (females). Mr. R. Adkin exhibited a series of *Vanessa urticæ*, bred during 1892, in Sutherlandshire, N.B., which were generally dark in colour and with markings well defined, also a specimen bred from the Essex coast, unusually light in colour. Mr. Sauze a small collection of Ichneumonidæ captured in the perfect state. Mr. Jenner Weir exhibited specimens of a group of the Nymphalinæ from the African region, mimicking others from the groups Danainæ and Acraeinæ. An interesting discussion ensued, and Mr. Weir referred to the fact that non-scented species of butterflies had been found eaten by birds, but scented species never so found, and Mr. South said that butterflies of the Danaine order generally escaped the attacks of mites in collections.—F. W. HAWES and H. WILLIAMS, *Hon. Secretaries.*

LANCASHIRE AND CHESHIRE ENTOMOLOGICAL SOCIETY.

March 3rd, 1893.—The President (Mr. S. J. Capper, F.L.S., F.E.S.) in the chair. Mr. W. E. Sharp read a paper entitled "Notes on some Irish and other Coleoptera."

After describing the division of England and Ireland from the continent, he proved by the insect fauna that it was probable Ireland was the first to be separated, and enumerated many species taken by himself, including *Philonthus lucens*, new to the Irish fauna. He then read a list of additions to the local fauna. Mr. Willoughby Gardner, F.R.G.S., read a paper entitled "Notes on some of the rarer Aculeate Hymenoptera of our District." After presenting a copy of his "Hymenoptera Aculeata of Lancashire and Cheshire" to the Society's library, he described several species rare to the district, which he asked lepidopterists and others to keep a look out for during their entomological rambles. Both papers were well illustrated by specimens. The President exhibited specimens of *Bombyx quercus*, including some fine varieties. Mr. Green, a collection of local hymenoptera. Mr. Watson, *Papilio machaon* from England, Northern India, Japan, &c., and its huge variety *hippocrates* from North-East China. Mr. Jones, on behalf of Mr. Bowler, a specimen of *Sphinx convolvuli* captured at Broadgreen.—F. N. PIERCE, *Hon. Secretary*, 143, Smithdown Lane, Liverpool.

MALACOLOGICAL SOCIETY OF LONDON.

A Meeting was held on the 27th February, at 67, Chancery Lane, to form a "Malacological Society of London." W. H. Hudleston, Esq., F.R.S., presided. About 70 gentlemen having intimated their willingness to join such a Society, it was decided that these should constitute the original members. The subscription was fixed at 10/6 per annum, with an entrance fee of like amount. The original members and all who join during the present year will be exempt from this entrance fee. The officers were then elected as follows:—President, Dr. H. Woodward, F.R.S.; Vice-Presidents, Lieutenant-Colonel H. H. Godwin-Austen, F.R.S., &c.; W. H. Hudleston, F.L.S., J. Cosmo Melvil, F.L.S., E. A. Smith, F.Z.S.; Treasurer, G. F. Harris, Esq., F.G.S.; Secretary, E. R. Sykes, F.Z.S. Other members of the Council—H. W. Burrows, G. C. Critch, F.G.S., W. Crouch, F.Z.S., Rev. Canon Norman, D.C.L., F.R.S., &c., J. H. Ponsonby, F.Z.S., G. B. Sowerby, F.L.S., B. B. Woodward, F.G.S. Arrangements were made for drawing up rules. The next meeting was fixed for 14th April, and subsequent meetings were fixed for the the second Fridays in May and June, after which there will be no meeting till November. Anyone desirous of joining the Society should communicate with the Secretary, E. R. SYKES, 13, Doughty Street, London, W.C.

GUERNSEY NATURAL SCIENCE SOCIETY.

March 8th, 1893.—The usual monthly meeting of the Guernsey Society of Natural Science and Local Research was held at the Guille-Allès Library. The President, Mr. E. D. Marquand, in the chair, and there was a good attendance of members. Mr. W. A. Luff exhibited a number of local insects, which he described. He also read from a printed but undated source, the speech of a former Lieut.-Governor on the formation of a Society for the Promotion of Science in the island. Mr. W. Sharp, hon. sec., read an interesting paper on the Folklore of the Island, contributed by one of the members. Mr. A. Collenette showed a specimen of dressed flint found by Mr. Bartlett, in a field near the Bailiff's Cross; also a number of curious mineralogical specimens. A paper was read that had been contributed by Mr. Sinel, of Jersey, describing the exploration made by him and other gentlemen of *La Cotte a la Chevre*, or the Goat's Cave, which is situated some way up the cliff near Grosnez Point, Jersey. One of the exploring party was Mr. Hutton, photographer, formerly of Guernsey, and there was exhibited at the meeting a number of worked flints which Mr. Hutton then picked up, and which are now in the possession of Capt. Lukis, by whom they were kindly sent, through Mr. Derrick, so that the members might examine them. Mr. Sinel describes the cave as being about 22 ft. long, some 16 ft.

wide, and 12 ft. high, the opening being due north, and the shape very irregular. On excavating through the successive clayey deposits that formed the floor, they found the site of an ancient fire, quantities of wood-ashes, fragments of bone, worked flints, flint arrow-heads, &c., all clearly showing that in former times the place had been used as a habitation. Mr. E. D. Marquand next read some notes on the results of microscopical examinations which he had made on various samples of clay from different parts of the island, furnished to him by Mr. Derrick. These notes were full of interest, and showed the absence of diatoms or other organic remains in the clay.—W. SHARP, *Hon. Secretary.*

EPEIRA QUADRATA.—The snare and nest (or domicile) of this spider are to be found in abundance on heathy commons during the latter part of September and earlier half of October when the spiders are adult.

The former is large and composed of strong threads stretched from a low furze bush or other shrub and is of the usual *epeiroid* form, namely, wheel-shaped (orbicular) and vertical. It is rendered more noticeable on account of the bees and flies which are trussed up in white silk and hung in the web, for these catch the eye readily, when the snare often fails to do so.

The nest or domicile consists of a large semi-sperical, tent-like structure opening mouth downwards, spun up amongst the heather and furze-bushes. Often, too, the nest is prettily bowered over with grassy bents and its white silken roof inwoven with leafy fragments so as to be almost completely concealed from view.

During the warm, sunny, October afternoons, last year, close to this town, numbers of adult males were to be seen wandering about on the heather in the vicinity of the webs of the gentler (?) sex. Some had got hold of the main lines and were telegraphing by a curious system of long and short pulls, understanded only of themselves, all manner of messages of love.

The doubtlessly prepaid reply-pulls must settle down to a fairly regular series of short but gentle vibrations before Romeo will venture to draw up overagainst his Juliet. Should Juliet give a sudden spasmodic pull or two, Romeo 'skedaddles' till his Epeira-love has somewhat modified her messages.

A little later in the month the large compressed-spheroidal egg-cocoon, woven of coarse bright-yellow silk may be found spun up amongst the heather stems.

Should Mr. Stott wish for any further information I shall be happy to accommodate him if I am able.—Rev. F. O. P. CAMBRIDGE, 5, Henry Street, Carlisle.

NATURAL HISTORY appears to be very popular in the parish of Hackney. Not only is the latter the head-quarters of the North London Entomological and Natural History Society, but a column on the subject has been introduced in the *Mercury*—a bright, healthy-toned weekly newspaper, devoted chiefly to the interests of Hackney, Homerton, Canonbury, &c. The Editor is Mr. J. Stephenson, a son, if we recollect rightly, of the author of a work on the Birds of Norfolk.

VEGETABLE GALLS AND GALL INSECTS.

BY S. L. MOSLEY, ESQ., F.E.S.

Read Lancashire and Cheshire Entomological Society, October 10th, 1892.

It is a matter of some surprise that out of the large number of students of insect life who exist in this country there are not more who pay attention to the subject of Galls. Such students, indeed, may be counted on the ends of one's fingers, though galls are among the most curious and interesting of insect productions. Perhaps it is because the subject seems too much of a mixture, for while the gall maker, in most cases, is certainly an insect, or a near ally, it is by no means clear that the gall itself, apart from the insect, can be studied as an entomological subject. The student, in fact, must become a kind of entomologist-cum-botanist, not always an agreeable mixture at first sight, but which, after a very short struggle usually resolves itself into a wall of mist, easily passed through. It has also been objected that the study of gall insects as a group is too complicated, as gall makers are scattered over several orders of insects, and some are even not insects at all; the student has thus not only to be an entomologist and botanist at the same time, but he must be prepared to tackle some of the more difficult departments of entomology—Coleoptera, Diptera, Homoptera. Another objection to the study of galls is that many of them are so soft and succulent that they cannot be preserved so as to make agreeable objects for the cabinet, without which the insects themselves would be of very little interest. Then there are difficulties, I admit, in breeding out the flies, for, unless the galls be gathered just at the proper time (and this is not always easy or convenient to do) we may try in vain year after year to rear the inmates.

Now, I hope that what I am saying will not detract from the hope I have of enlisting you into my sympathy. No one can expect to be a collector of galls without being galled by difficulties and disappointments now and then, just as all collectors are. But let us clear the ground as we go along: we will consider these difficulties. First, as to the botanical difficulty—that the study of galls involves a considerable knowledge of plant life. I do not think that it does so more than other departments of entomology, for nothing more is needed than to know the names of the plants, and this even is not absolutely necessary. Galls are usually conspicuous, and such that a person not a botanist may be pretty well certain when he sees a gall that it is an addition to, and not essentially a part of the plant on which it grows. Then having secured the gall, and a part of the plant with it, it is usually a very easy matter to find out the name of the plant, which if one is not able to do himself, he has most probably botanical friends to whom he can refer. Having found the name of the plant, the name of the insect is then, in most cases, an easy matter, for this can usually be arrived at by the appearance of the gall, and as one gall is generally very different from all other galls, the student has thus an immense advantage over the student of some of the smaller and more intricate groups of *Coleoptera*, *Diptera*, or *Lepidoptera*—say the genera *Homolota*, *Chironomous*, or *Gelechia*. Then again, because gall makers are distributed over several orders of insects, it is not imperative that the student shall posses a full knowledge of all these orders, for the gall makers are, as a rule, confined to certain well-defined genera in each order. With regard to the preservation of the galls, I think the cases exhibited show that by one means or another all the difficulties in this way can be overcome.

Now we come to the question "What is a gall?" Let me try to answer it. A gall, that is a vegetable gall (for there are animal galls as well), is an excrescence of contorted cell growth, produced on a plant by the agency of an insect (or insect ally) inside of which the insect lives. A true gall *entirely* encloses the inmate; a psendo-gall only *partially* does so.

"How is the gall produced?" is a question to which no satisfactory answer has yet been given. It is known, as I have already said, that a gall is produced by an insect. It is also known that the insect, with its ovipositor, pierces or punctures or slits the object upon which it wishes to produce a gall; and it is also believed that a peculiar liquid is deposited in the opening where and when the egg is laid, but this is as yet only a belief. And even if this be so, how such a liquid acts in producing in one case a hard round marble, in another a soft succulent cherry, and in a third a diminutive button, all from the same leaf, the same kind of insect always producing the same kind of gall, is to my mind, one of the greatest wonders of creation. And what makes this still more wonderful is that the grub inside, as pointed out by Kirby and Spence, seems to have nothing to do with the building of the house it is destined to live in. The gall insect "provided with an instrument as potent as an enchanter's wand, has but to pierce the site of the foundation, and commodious apartments, as if by magic, spring up and surround the germ of her future descendents." Truly "there are more things on earth (not to mention Heaven) than are dreamt of in our philosophy."

A theory was brought forward by Newman, and very ably put by him, that a gall is not an additional part to the plant on which it grows, not a part that did not previously exist, but an existing part modified for the purpose of a habitation. Thus one gall is a modified leaf, another a modified bud, a third a modified stamen, and so on; and although this theory seems plausible in many cases, it is not always equally obvious, and each must form his own opinion upon its merits, until some new student comes forward to knock it on the head.

Galls sorely puzzled the ancients, who regarded them as very mysterious objects. They were unable to account for the presence of a grub or a fly in a substance where they could find no way in and no way out. In those days spontaneous generation was the dominant belief, and the only explanation that Pliny and his contemporaries could apply to gall grubs. Redi successfuly combated this theory, but himself fell into as great an error, in the case of gall grubs, in supposing that the grubs were generated from the gall substance. After this had been proved untenable it was supposed that the eggs were laid in the earth by insects, and these eggs were drawn up along with the sap of the plant, some lodging in the stems, others in the leaves, others in the flowers, and others causing obstruction which produced the galls. It is now well known that they are all produced in the way I described—by eggs deposited by parent insects in the substance upon which the gall grows. It is worthy of remark, however, that the gall begins to grow, and in many cases has attained considerable size, before the grub hatches from the egg, so the grub can have little, if anying, to do with the forming of the gall. It is curious that the puncture by a given species should always produce exactly the same gall. Supposing a liquid is secreted, is the secretion different in every species? or how does it act to produce a different gall? It is also singular that very dissimilar species should produce almost exactly similar galls, as the nail gall on lime, produced in Britain by a mite and in America by a midge.

The subject of parasitism is one of very great interest, but one which scarcely falls within the scope of the present paper. Many gall makers are very subject to parasites, and from the same galls the student may often breed three or four or more sets of very different flies. Some of these parasites prey on the gall-making grubs, some feed in the substance of the gall; some are hyper-parasites preying on other intruders, while some only go into the galls for lodgment, or protection, or undergo their transformations.

Another very interesting phase in the study of gall insects is the apparently unaccountable predomination of one sex over the other. It was at one time thought that some species had no male, for thousands of individuals have been reared everyone of which proved to be a female and the male was not known. But the theory of alternation of generation first announced by Mr. Walsh (U.S.) in 1870, has thrown some light on this point, that is, that the same species produces two different kinds of galls, the two kinds alternating, generation after generation, and that males are produced in one

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This part contains a portrait of the Rev. W. F. Johnson, M.A., F.E.S., President of the Armagh Natural History and Philosophical Society.

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generation and not in another. This the common cup apple *(Andricus terminalis)* is supposed to be the summer form, and the root gall *(Biorhiza aptera)* the autumn form of the same insect; the oak spangle *(Lenticularis)* and the currant gall *(S. baccarum)* also two generations of the same species, but this is a subject which requires working at by specialists.

With regard to the breeding of gall flies there is a very good paper by Mr. Fitch ("Entomologist," Vol. VIII., p. 170) in reply to a question of mine when I was beginning this study. The galls should be gathered on a dry day, and when fully mature, and should be kept in gally pots covered with glass. Have nothing in the pots except the galls; no leaves, no sticks, nor anything except the galls, otherwise mistakes may occur. Keep them in a cool place, and not in the sun, and when the flies appear they will crowd upon the glass cover, which may be gently removed and tapped over a saucer of hot water. The flies drop on the hot water with expanded wings, and are killed, and may be lifted out on bits of paper. When dry they may be taken from the bits of paper and mounted, with tragacanth, on white cardboard. The main thing to guard against in breeding gall flies is mould, and this may be prevented sometimes by using glass topped boxes instead of gally pots. Do not throw the galls away when the first lot of flies have appeared: parasites will come out afterwards.

The only list of British gall insects anything like complete, of which I am aware, is that by Albert Müller in the "Entomologist's Annual" for 1872, where he enumerates 36 Hymenoptera, 36 Diptera, 9 Coleoptera, 8 Homoptera, and 2 Lepidoptera, a total of 91 species. To this list I have added the Mite Galls, also several Pseudo-Galls, perhaps purposely excluded by Müller, and by searching through the "Entomologist," "Entomologist's Monthly Magazine," and other sources, together with my own observations, I have brought up the species known to me to 191. And now let me say that I shall be very pleased to receive galls, particularly from Yorkshire, Lancashire, and Cheshire, with a view to compiling county lists, or to correspond with persons interested in the subject. Botanists have ample opportunities for finding galls, and they would be rendering service to science if they would pick up such as come in their way, and send them in for identification.

My list of galls is made up as follows:—*Coleoptera, 10 sp.* I have added *Superda populnea* to Müller's list, and there are a few others still to add.* *Centodeynchus sulcicollis* galls the roots of turnip and cabbage, and is included among injurious insects by Miss Ormerod.

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* Dr. Ellis has very kindly offered to look up the Coleopterous gall makers for me.

I should be particularly glad of records of this species from Northern Counties. Observers should be careful not to confound this with the growth known as "fingers-and-toes," nor with the attack of the fungus, *Peronospora brassicæ.*

Hymenoptera, 66 sp. Chiefly belonging to the *Cynipidæ*, and mostly attached to oak, on which there are about 40 species in Britain. Figures and descriptions of all the European species will be found in the "Entomologist," 1874 to 1875. The other gall-making Hymenoptera are Sawflies attached to willow, for which see Cameron's "Phytophagous Hymenoptera" (Ray Soc.); and several species attached to rose, the best known being the mossy gall, bedeguar.

Diptera, 91 sp. Chiefly of the genera *Cecidomyia* and *Trypata.* A list of the British Cecidomyidæ, by Mr. Fitch, will be found "Entomologist," XIII, 146, and of Trypata "Entomologist," X., 31; XII., 257 and 259; XV., 138; also various papers by Inchbald.

Lepidoptera, 3 sp. *Asychna aratella*, *Laverna decorella*, and *Retinia resinana.*

Homoptera, 8 sp. Belonging to Aphidina. Fully described in Bucktons "British Aphides" (Ray Soc.).

Arachnidlæ, 13 sp. Produced by the leaf mites (Phytoptus), enumerated, along with several European species in Murray's "Aptera" (S. Kensington Handbook).

THE PTEROPHORINA OF BRITAIN.

BY. J. W. TUTT, F.E.S.

(Continued from p. 74).

Leioptilus osteodactylus, Zell.—This brightly tinted species feeds on the same plants and is found in almost the same localities as *tephradactyla.* It is also very local in Britain although abundant where it occurs.

SYNONYMY—*Osteodactylus*, Zell., 'Isis,' 1841, Pl. 4, 8-9; 'Linn. Ent. Zeit.,' VI., 388; Dup., IV., 88, 7; H.-S., 29, V., p. 381; Frey, 417; Sta., 'Manual,' II., p. 443. *Microdactyla*, Zett., 'Ins. Lapp.,' 1013.

IMAGO—The fore-wings of this species are divided into two lobes and they are of a clear pale yellow or sulphur colour, with a slightly darker costa. Just beyond the disc is a short black longitudinal patch. The hind-wings are divided into three plumules and are of a greyer tint than the fore-wings. Stainton's diagnosis is as follows:— "Fore-wings very pale sulphur, with a brown dot before the fissure, and beyond it a pale brownish blotch on the costa" ("Manual,' Vol. II., p. 443). Of the perfect insect, Mr. Gregson writes:—"It has the head, body and upper-wings sulphur-yellow, in fine specimens slightly darker on the costa, and having a darkish elongated patch beyond the middle; the under-wings darkish ash-coloured, abdomen and legs light sulphur-yellow. Expansion of the wings from eight to ten lines" ("Entomologist," Vol. III., p. 202). Zeller's diagnosis of this species is as follows:—"Collari epistomisque brunnescentibus, corpore alisque anterioribus dilutissime sulphureis, his puncto ad fissuram fusco, litura costali laciniæ anterioris fuscescente (♂ ♀)" ("Linn. Ent." etc., p. 388).

Larva—The larva of this species hatches in the autumn and feeds on the flowers and seed-heads of *Solidago virgaurea*, it then hybernates and does not appear to do any more feeding up before pupation in the spring. It is of a pale brownish colour with darker brown longitudinal stripes. Mr. Gregson first described the larva of this species. He writes:—"Larva delicate pale brown, with five darker longitudinal stripes; rather stout in the middle, but attenuated at both ends. It feeds upon the flowers and seeds of *Solidago virgaurea* (golden rod) living through the winter, and spinning up in the spring, appearing in the perfect state in July and August" ("Entomologist," III., pp. 201-202). Mr. Hellins then wrote:—"For years past, ever since I learned that larvæ could be beaten from various wild flowers, and that the golden-rod was good for certain *Eupitheciæ*, I had been puzzled with a little fusiform, brown-striped larva, which I often found on it, but could never rear to the perfect insect, as it always died in winter. I remember at one time sending specimens to some five or six entomologists (not beginners like myself) by whom it was referred to as many different genera and families, not of Lepidoptera only, but also of one or two other orders, much of course to my satisfaction. However, on reading in a recent number of the "Entomologist" this year, a note by Mr. Gregson on *osteodactylus*, I saw at once that he had solved my puzzle, and since then I have confirmed his observations by myself breeding, quite unexpectedly, three specimens of the moth, one on July 8th, one on August 26th, and the third I found dead, not having noticed when it came out. I remember that last year two or three of these larvæ were on some golden-rod flowers, which I had picked for another species, but I took no care of them, expecting that, as usual they would dry up in the winter. The only difference in their treatment was this, that they were left to take their chance (mostly out-doors in a shady corner of my garden), with their withered food in a flower-pot, the earth in which was covered with a thick growth of moss *(Hypnum serceum)*. I noticed that two of them after walking about for a time on the covering of the pot, at last settled down for hybernation just where the leno and the moss creeping up to the rim met, and spun a thread or two to keep themselves somewhat protected. I did not watch them much after this, but imagine they left their hybernacula some time in April, for I know it must have been in that month that, as I was beating the sallows for catkins tenanted by *Xanthiæ*, one of these little golden-rod larvæ fell into my net, evidently being on his travels previously to spinning. This capture raised my hopes of at last seeing the moth, so I tried him with various kinds of food then out in leaf, but could not see that he ate anything; and, having unfortunately squeezed him to death, I once more gave up the puzzle as a bad job. It was a great relief, therefore, to me to read Mr. Gregson's note, and still more so to breed the moths myself; for though in a general way I don't care much for small things, finding plenty of occupation for all my spare time in trying to rear Macros, yet this little larva coming in my way year after year troubled me. The moths seem to be on the wing in July and August; the larvæ feed through September and October, till the downy seeds of the golden-rod fly away, then hybernate till April, when, after moving about a little, they spin up" ("Entomologist's Monthly Magazine," Vol. IV., p. 157). Mr. Hellins then adds:—"Since writing the above, I have been reminded by Mr. Buckler that three or four years ago I sent him some larvæ, beaten from the flowers and seeds of yarrow *(Achillea millefolium)* growing near the sea, which appeared identical with the larvæ on golden-rod, now proved to be *osteodactylus;* and the mention of this fact has also made me recollect that I have occasionally beaten one or two of them from mugwort, *Artemisia vulgaris;* but in neither case did I succeed in breeding the moth" ("Entomologist's Monthly Magazine," Vol. IV., pp. 157-158). It appears very doubtful to me that this species feeds on either of these last mentioned plants, and since Mr. Hellins did not make a critical examination it is more than probable that from *Artemisia* he had beaten the allied species *lienigianus*, and from yarrow one of the *Platyptilia* species. The plume larvæ vary so much in colour, and their little hairy coats make them look so alike superficially, that only one very conversant with the larvæ could possibly discriminate some of the various species. Of the larvæ of *osteodactylus*, Mr. South writes:—"In seed heads of *Solidago virgauræa*. The larvæ hybernated among the dried heads of *Solidago*, some making a snug cocoon-like retreat of the seed-down, others remaining without any such protection; and these assumed a reddish tinge during the winter" ("Entomologist," Vol. XXII., p. 36). I take it that they would hardly make hybernacula of the seed-down in a state of nature as it usually falls off the plant or gets blown away before the spring.

Pupa—The larva pupates in the early spring after hybernation but does not emerge until July. The pupa does not appear to have been described although the species has been frequently bred. I have bred the moth myself but never thought that the pupa was undescribed.

HABITAT—The species has a wide range in Britain. I have it from several localities, amongst others from Bristol and Tilgate Forest. It is recorded from Conistone by Mr. E. M. Geldart, "Entomologist's Monthly Magazine," Vol. II., p. 184, and does not appear to be uncommon in the Cumbrian Lake District. Dr. Jordan mentions it as "not uncommon amongst golden-rod on the Riffelberg" (*l.c.*, Vol. XVI., p. 21), and as "occurring at Ormeim and at Faleide" (*l.c.*, Vol. XXV., p. 444). Staudinger and Wocke give as its distribution:—"Central and Northern Europe and Central Italy" ("Catalog," p. 344). Stainton gives as localities:—"Bristol, Lake District, Scarborough (very common)" ("Manual," II., p. 443).

TIME OF APPEARANCE—Strange to say although this species pupates so early it appears later than its ally, *tephradactyla*, being on the wing very rarely before July. It appears to be confined to woods and occurs in some years in great abundance, in others it is comparatively scarce. Stainton gives "July" as the date for the appearance of the imago. Porritt "June and July" (*in litt.*).

NOTES ON CERTAIN COLEOPTEROUS INSECTS FOUND IN CITY WAREHOUSES.*

BY G. A. LEWCOCK.

I have no doubt it has frequently occurred to many entomologists that our knowledge of common insects in general is sometimes very deficient; and, although many persons affect a derision of matters relating to common insects, yet it is absolutely necessary that we should acquire this knowledge. The lepidopterist and the coleopterist may be well versed in things pertaining to their favourite Order, but outside of these subjects they either do not care or do not trouble to interest themselves. Therefore, when information is sought by persons who, in a promiscuous manner, pick up stray insects, more especially indoor species, it is little wonder that the lepidopterist is as much at a loss for information respecting coleopterous species as the coleopterist is on subjects relating to lepidoptera. Consequently, they often fail to enlighten an inquirer as to the name, habits, or nature of an insect.

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* *Read at City of London Entomological and Natural History Society, April 4, 1893.*

I do not think it possible for entomologists who go to and from business daily and mix with their fellow-men to avoid a betrayal of their knowledge of entomology ; it may be owing to a casual remark, or by a direct inquiry. Some years ago, soon after I came to London, this happened to myself. One day in the City my attention was attracted by someone who had picked up a "creeping thing" from the floor, and placed it on the table. "Look what a lot of legs it has got," said the captor; "and doesn't it run?" I looked at the creature, and replied "Yes ; but there are only six legs." This remark created some astonishment, and caused a further examination, when it was seen that six was the correct number of legs. A little more conversation took place, and I then explained that the animal in question was the larva of a beetle named *Dermestes lardarius*. This piece of information was received with laughter, as nothing so much delights the non-scientific portion of our community as the sound of entomological names. After this I became the recipient of anything that happened to turn up—were they beetles, bugs, spiders, or cockroaches.

With reference to the name *Dermestes*, this term is frequently confounded with "domestic," and one often hears of the *Domestic lardarius* in the City, as the species is of common occurrence there. The two words, however, have totally different meaning; the scientific name *Dermestes* being derived from the Greek, and means a devourer of skin, which is descriptive of the habits of the beetle ; while *domestic* (from Latin *domesticus*) relates to the house. As *Dermestes lardarius* perhaps is oftener found indoor than out, the term "domestic" is in a certain sense applicable, more especially as the Latin *lardarium* refers to a larder.

Both beetle and larva of this species are plentiful in City warehouses, and with but little trouble one can obtain a good supply of them. Provision dealers are sometimes greatly troubled with them, and I have no doubt they could be obtained in almost any number throughout London. The larva is a fast runner, and can be found all through the year. It will feed on the hard skin and refuse of meat, making curious galleries by throwing up a yellow wax-like substance all round its food. It is difficult to tell the pupal stage, as in most cases the pupa is formed within the skin of the larva, and it still retains a certain power of motion in the legs. The beetle forms rapidly, and generally makes its appearance in two or three days after changing to pupa. On emerging, the pattern of the wing cases is at once discernible, although the beetle is of a slightly paler colour. The pupal shell is probably devoured by the beetle, as I have never found much of it left.

Among other beetles frequently occurring in the City are the so-called "bookworm" species. These all belong to the group Ptinidæ, and include the following species:—*Niptus hololeucus*, *Mezium affine*, *Gibbium scotias*, *Anobium paniceum*, *A. domesticum*, *Xestobium tessellatum*, and *Ptinus fur*.

As reference has frequently been made to species of Bookworms in the "Publishers' Circular" and other publications, it will not be out of place to give some particulars respecting the life-histories of these species, as observed by myself in a City printing office. In the first place it must be stated that the reports concerning the ravages of bookworms are nearly always from persons who appear to be unacquainted with the rudiments of Entomology, and possibly the statements as to the damage done by these species are greatly exaggerated. But real harm may occur where books and bookshelves are entirely neglected, and where dust and moth doth corrupt, and beetles and cockroaches roam without let or hindrance, while with due care and attention this would be entirely obviated. In the British Isles, at least, little danger should be apprehended from bookworms. But in warmer countries, where cockroaches and white ants abound, then extra precaution is highly necessary. As we are concerned only with bookworms which affect our own country I will now proceed to deal with them specifically.

In endeavouring to trace the origin of the term of "Ptinus" my labours have proved almost futile, as indeed is the case with many other generic terms in this group. The Greek word Ptenos=winged, and with the prefix *a* means without wings. The species under *Niptus*, *Mezium*, *Gibbium*, and *Ptinus* appear to be all apterous, therefore the term Ptinus hardly applies. With regard to *Niptus*, this may be a transposition of the letters in the word *Ptinus*; but the term has also been written *Tipnus*. *Mezium* is likewise of obscure origin; but *Gibbium* probably refers to the hump-back or convex shape of the elytra, and is rather an appropriate term. With regard to the specific or trivial names, some may be made out in a satisfactory manner, while others cannot be. Therefore, although a knowledge of derivatives is very useful, taking it as a whole, applied to entomological terms, it is rather profitless work.

Niptus hololeucus is doubtless the commonest species, and may be found dropping about all over City warehouses, particularly during the warm months of the year. The larva will feed on almost any dry substance, such as wood, bodies of moths, beetles, or dried skins. Sometimes it finds its way into store-boxes of insects which have been neglected, and does a deal of damage. In fact it may be found in any house, whether old or new. Two or three broods of the beetle can be obtained during the year, but from November to April appears to be the period for the winter larva. I have bred the insect on several occasions, and have taken much interest in watching its development from a minute larva to the perfect state. The larva is of a dirty white, with a hard head and mandibles, formed rather for boring than otherwise; it will eat through paper with the greatest ease, and sometimes will even eat its way a chip box. It matures rapidly in the summer, and on attaining full-fed stage, the skin is shuffled off to apex, leaving the pupa exposed to view. The wing cases of the beetle are quite discernible, being folded round the front, as in lepidopterous pupæ. The tail is quite flexible, and on touching or handling the pupa, it wriggles about sharply. As the larval stage is of longer duration in the winter, so also is the pupal stage, and some four or five weeks elapse before the beetle makes its appearance. It is often found in old dwelling-houses, and not unfrequently drops into cups and basins in cupboards. It is said to be fond of moist sugar; but figs certainly possess attractions for the larvæ, as I am well able to testify; having once lost an entire brood through the larvæ gorging themselves to death on this pabulum.

Two closely allied insects to the last are *Mezium affine* and *Gibbium scotias.* The habits of these species are very similar to that of *Niptus.* The larva of *M. affine* is of the usual wood-boring type, with hard black mandibles, and covered with coarse hairs. The colour is of dirty white, with opaque patches or ridges at each segment. Although the beetle is to be obtained at all seasons of the year, yet in winter the larva is some five or six months in attaining the full-fed state; but during the summer months I have reared beetles from ova in the short space of five weeks.

Respecting this species, Mr. Chitty ("Entomologist's Monthly Magazine," February, 1893) remarks that "I have recently come across this insect in a granary in London, although only sparingly. Many of the specimens were dead or broken, but in two (from their colour they seem slightly immature) the elytra are covered all over with hairs or bristles, which are closer and longer in the neighbourhood of the scutellum. The existence of these bristles appears to have escaped the attention of our English writers on coleoptera, probably because the bristles wear off very easily, and, though occasionally traces of them may be found by close examination even after they are broken, they seem eventually to disappear without leaving any visible scar or sign of their former existence." Mr. Chitty also states that the descriptions contained in Stephens, Cox, and Fowler are from the usual worn specimens, but that Mr. Gorham pointed out to him that Mulsant ("Gibbicolles," page 393) describes *M. affine* as having the elytra gibbous, with a hairy pad at the extreme base, of a brown or pitchy red, smooth, spread over with scale-like upright bristles. So far as I have been able to judge, the descriptions in British Handbooks on Coleoptera are not always original, but are sometimes taken or

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translated from other works, so that it is quite possible that the omission referred to by Mr. Chitty may be due to this fact.

With regard to the bristles on the elytra (several of the specimens exhibited retain them), this can hardly be considered a constant feature, as many specimens bred by myself have emerged quite destitute of bristles ; but this perhaps may be caused during the emergence from pupa. It may be well to mention that some of the *Gibbium* specimens also are sparsely covered, and *Ptinus fur* thickly covered with hairs or bristles. Then again, some of the living (bred) specimens exhibited, are of pale reddish colour, while others are a deep black, all of which have been kept together alive for five months ; so that the question of maturity can hardly be decided by the colouration of the elytra.

Of the genus *Anobium*, all are wood borers, with the exception of *A. paniceum*, which thrives on almost any farinaceous food. Only two or three years ago Mr. J. A. Clark exhibited packets of Parrish's Food, which were riddled through and through as if shot, containing all stages of the beetle. It also feeds on the pasted backs of books, whole ginger, and a variety of things. *A. domesticum* has never, to my knowledge, forsaken the wood, no matter how dry or hard it may be.

Xestobium tessellatum is entirely a wood-borer, but turns up occasionally in the City. It is also attached to oak trees, willows, &c.

Hedobia imperialis does not put in an appearance in the City, but very dwarfed specimens of *Ptinus fur* are often found running about in warehouses.

Other beetles occurring in the City are *Attagenus pellio*, of which several were captured in Albion Hall just previously to a meeting of the Society ; *Dermestes vulpinus* among furriers ; *Mycetœa hirta* found in champagne corks at Cornhill ; *Pentarthrum Huttoni*, which is strictly a wood-borer. In addition to the foregoing may be added *Tenebrio molitor*, *T. obscurus*, *Alphitobius diaperinus*, and *A. piceus*, all of which are to be found in bake-houses and at corn-dealers; and sometimes stray specimens are picked up in other places ; *Blaps mucronata* and *B. similis* are mostly found in restaurants and eating-houses.

NATURALISTS OF THE DAY.

XVI.—J. B. HODGKINSON, F.E.S.

It is said that the poet is born, not made, and the same is no doubt true of the Naturalist. Still, it often happen the taste for Natural Science lies dormant, until some trivial circumstance stimulates it into energy and the career commences.

J. B. Hodgkinson was born at Preston, in Lancashire, in the year 1823. Four years later his parents removed to Carlisle where they resided eleven years. His father was fond of Botany, and made the acquaintance at that city, of the late T. C. Heysham, a noted Ornithologist and Entomologist. Calling there one day with his son, the subject of our sketch, they saw some butterflies pinned on a cushion. Their attention was attracted to them, Mr. Heysham lent them Lewin, Donovan, and other works with coloured plates, the taste for Natural History was awakened, collecting was commenced at once, with enthusiasm that would not wait for proper equipment, an old fishing net was made to do duty for an insect net, and from that time forward Mr. Hodgkinson has never wearied in his pursuit of Lepidoptera. Yet his circumstances were such as would deter many less persevering or possessed of less ardour. He served his time to be an engineer, and worked as journeyman at Manchester, at North Fleet in Kent, and at other places where work was to be had. When about 40 years of age he went into the cotton trade, in which business he remained some 20 years, then retired to devote his well earned leisure entirely to his favourite study.

Mr. Hodgkinson was thus a contemporary and co-worker with those men who made the North of England so famous in Entomological Annals, and during his long career he has become known for the many new species he has introduced into the British list, and the many rarieties with which he has assisted collectors.

In 1846 he had a two months tour in Scotland, during which he visited Rannock, then less known as a collecting ground than it is to-day. During this trip he captured some 1,700 specimens of Lepidoptera including 6 species new to the British fauna, viz.: *Fidonia carbonaria*, *Scopula decrepitalis*, *Coccyx cosmophorana*, *Stigmonota dorsana*, *Tinea picarella*, and *Lithocolletis vacciniella*. Of these the late Henry Doubleday named *carbonaria* and *picarella* from pen and ink sketches sent him by Mr. Hodgkinson. Ten years later, he and the late T. H. Allis took *Cidaria reticulata*, but passed it over as a second brood of *silaceata*. Shortly after this Allis was at Epping, looking over continental types, when Doubleday pointed to this species and said "Thomas thou ought to take this in thy rambles in the Lake District." Allis said they had it already, but it was twenty years longer before it was met with again. The Rev. J. Hellens then told Mr. Hodgkinson the food-plant and in 1878 he reared the species, and another new to Britain *(Penthina postremana)* from the same plant. Altogether he has added about 30 species to the British list, two of which, *Pterophorus Hodgkinsoni*, and *Nepticula Hodgkinsonii* were named after him, the former by his friend and co-worker Mr. C. S. Gregson, though some now consider it to be a var. of the *Zophodactylus* of Duponchel.

Mr. Hodgkinson did not entirely confine himself to Lepidoptera. For some time he worked hard at Coleoptera, and gave a good deal of time to Ornithology. His collection of British Birds, numbering over 600 specimens, was presented by him to the Museum of his native town.

The writer had the pleasure of seeing Mr. Hodgkinson's collection last year. It is wonderfully complete, only some half-a-dozen of the recognized British species being unrepresented, while he has long rows of many of the rarest ones.

Our portrait is from a Photograph taken in 1891.

We regret to add that Mr. Hodgkinson is at present very ill, and quite unable to attend to correspondence.

Reports of Societies.

ENTOMOLOGICAL SOCIETY OF LONDON.

March 29th, 1893.—Henry John Elwes, Esq., F.L.S., F.Z.S., President, in the chair. Mr. Ernest Swinhoe, of Avenue House, Oxford, was elected a Fellow of the Society. Mr. G. C. Champion exhibited, for Mr. A. E. Stearns, a living specimen of a luminous species of *Pyrophorus*, which had been found in an orchid house at Dorking. It was supposed to have emerged from the roots of a species of *Cattleya* from Colombia. Mr. A. H. Jones exhibited living full-grown larvæ of *Charaxes jasius*, found by Mr. Freceric Raine, at Hyères, feeding on *Arbutus unedo*. Surgeon-Captain Manders exhibited a series of *Lycæna theophrastus* from Rawal Pindi, showing climatal variations, the rainy-season form being of darker coloration, and larger than that occurring in the dry season. The ground colour of the former on the under surface was markedly white with deep black striæ; in the latter form the ground colour was distinctly reddish, and the marking reduced to reddish lines. He said that the latter form had been described as *L. alteratus*. Mr. F. Merrifield mentioned that Dr. Weismann had now established that the colouring of *Chrysophanus phlæas* in different climates or seasons, though in part attributable to the actual temperature, was in part constitutional. Mr. S. G. C. Russell exhibited a beautiful variety of *Argynnis selene*, taken near Fleet, Hants; two varieties of *A. selene* from Abbot's Wood, Sussex; typical specimens of *A. selene* and *A. euphrosyne* for comparison; and a remarkable variety of *Pieris napi* from Woking, Mr. C. J. Gahan exhibited a microscopic preparation of the antenna of the larva of a beetle *(Pterostichus)*, for the purpose of demonstrating the sensory nature of the so-called "appendix" of the antenna, Since he wrote a note describing this structure, a short time ago, he found that Professor Beauregard had already suggested its sensory character, and was inclined to believe that it was an auditory organ. Mr. H. Goss exhibited a specimen of *Trogus lapidator*, Grav., believed to have been bred from a larva of *Papilio machaon* taken in Norfolk by Major-General Carden. Mr. Goss stated that he sent the specimen to the Rev. T. A. Marshall, who said it was a well-known parasite of *P. machaon* on the Continent, but not proved to exist in the United Kingdom. Mr. Merrifield said he knew this parasite, and had bred several specimens of it from pupæ of *P. machaon* received from Spain. Colonel Swinhoe read a paper entitled

"The Lepidoptera of the Khasia Hills. Part I." A long and interesting discussion ensued, in which Mr. Elwes, Mr. Hampson, Colonel Swinhoe, and others took part. Mr. W. Bartlett Calvert communicated a paper entitled "New Chilian Lepidoptera." Mr. J. W. Shipp communicated a paper entitled "On a New Species of the Genus *Phalacrognathus*."

April 12th, 1893.—Frederick Merrifield, Esq., Vice-President, in the chair. Sir John Talbot Dillwyn Llewelyn, Bart., exhibited a number of specimens of Lepidoptera, Coleoptera, and Hymenoptera, all caught in Glamorganshire. The Lepidoptera included two remarkable varieties of *Vanessa io*, both obtained from the same brood of larvæ, from which the usual eye-like spots in the hind wings were absent; varieties of *Arctia menthastri;* a long series of melanic and other forms of *Boarmia repandatia* and *Tephrosia crepuscularia;* and bleached forms of *Geometra papilionaria*. The Coleoptera included specimens of *Prionus coriarius*, *Pyrochroa coccinea*, *Otiorhynchus sulcatus*, and *Astynomus ædilis*, which latter Sir John Llewelyn stated had been handed to him by colliers, who obtained them from the wooden props used in the coal mines, made out of timber imported from the Baltic. Mr. Merrifield, Dr. Sharp, Mr. Bower, and Mr. Stevens made some remarks on the specimens. Sir John T. D. Llewelyn enquired whether the name of the moth which had a sufficiently long proboscis to fertilize the large Madagascan species of Orchis, *Angræcum sesquipedale*, was known. Mr. C. O. Waterhouse stated that the collections received at the British Museum from Madagascar had been examined with the view to the discovery of the species, but up to the present it had not been identified. Mr. H. Goss exhibited, for Mr. Frank W. P. Dennis, of Bahia, Brazil, several nests of Trap-door Spiders containing living specimens of the spider, and read a communication from Mr. Dennis on the subject. Several photographs of the nests and the spiders were also exhibited. It was stated that Mr. Dennis had found these nests at Bahia, in one spot only, in a cocoa-nut grove close by the sea. Mr. McLachlan read a paper entitled "On species of Chrysopa observed in the Eastern Pyrenees; together with descriptions of, and notes on, new or little-known Palæartic forms of the genus." The author stated that the species referred to in his paper had been observed by him in the Eastern Pyrenees, in July, 1886, when staying with Mons. René Oberthür. After alluding to the nature of the district, and its capabilities from an entomological point of view, the paper concluded with descriptions of certain new palæartic species of the genus. Dr. Sharp, who said that he was acquainted with the district, and Mr. Merrifield made some remarks on the paper.—H. Goss, *Hon. Secretary.*

CITY OF LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY.

Tuesday, April 4, 1893.—Exhibits. Mr. Clark, a male *Argynnis paphia* with extra black marking; a Xanthic specimen of *A. euphrosyne* and a gynandrous specimen of *Lycæna ægon*. Mr. Battley, living larvæ of *Thera variata* and *Ellopia fasciaria*. Mr. Simes, eggs of *Gonepteryx rhamni*, deposited on the terminal shoots of the buckthorn. Mr. Riches, cocoons of *Galleria cerella* and larvæ of *Tabanus bovinus*. Mr. Heasler, *Baptolinus alternans*. Mr. Lewcock, *Niptus hololeucus*, *Gibbium scotias*, *Xestobium tessellatum*, *Ptinus fur*, *Dermestes lardarius*, *Mezium affine* (bred) and larvæ of the same to illustrate his paper; also specimens of *Rhipiphorus paradoxus*, with larvæ imbeded in larva of *Vespa vulgaris* on which it is parasitic, and a long series of *Playtus cylindricus*, the last two species having been received from Dr. Chapman of Hereford. Mr. Lewcock then read a paper "On Certain Coleopterous Insects occurring in City Warehouses."* Messrs. Newbery, Heasler and others enquired the best way to breed *Dermestes lardarius*. Mr. Lewcock replied that the larvæ of this species fed upon the skins and sinews of animals, and that a beef bone with dried fragments of meat attached was as suitable as anything else to breed them upon. The proceedings terminated with a vote of thanks to Mr. Lewcock.

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* This Paper is given in full in another portion of the Magazine.

[My attention has been directed to the discrepancy between the report of the meeting of this Society on the 21st February last, when my paper "On Melanism" was read, and that in the "Entomologist's Record." I can only say that my report was printed verbatim from the copy supplied me by the Secretary, and the "Record" report is not correct.—Ed. B.N.]

THE SOUTH LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY.

March 23rd, 1893.—J. Jenner Weir, Esq., F.Z.S., President, in the chair. Mr. R. Adkin exhibited the following species of Diurni from Sutherlandshire, N.B., viz.: *Pieris brassicæ*, *P. rapæ*, and *P. napi*; *Argynnis selene*, *A. euphrosyne*, and *A. aglaia*; *Epinephele janira*, *Cœnonympha Typhon*, and *Thecla rubi*, and commented on the similarity of the forms shown to those occurring in the South of England. He noticed, however, in the *C. typhon* that although there was a considerable variation in the colour, in none were the dots on the hind-wings prominent as in many of the Rannock specimens. The specimens of *A. selene* and *A. euphrosyne* shown, were so remarkably alike, as to render it extremely difficult to distinguish with certainty, the one species from the other. Mr. H. Moore exhibited a striking example of fasciation in the young wood of *Salix capræa*, also an example of the transference of the scales to paper of an Indian butterfly of the Nymphaline group. Mr. W. Mansbridge stated that the specimen he previously exhibited as *Hybernia defoliaria*, was a melanic form of *H. aurantiaria*, Mr. A. W. Dennis having drawn his attention to the fact, Mr. Mansbridge exhibited a drawing of the antenna of these two species, showing the difference existing, also dark *Odontopera bidentata*, from Forres, N.B., a strikingly light specimen of *Hybernia leucophæaria*, and a series of *Polia chi*, var. *suffusa* from Horsforth near Leeds, darker than those from either Bradford or Huddersfield, and therein differing from Mr. Tutt's experience as previously expressed. Mr. H. A. Auld exhibited a species of *Cassida* from Fort White, Upper Burmah. Mr. T. W. Hall remarked on Mr. Moore's exhibit of *Salix capræa* and Mr. Mansbridge said he had seen the same peculiarity in Liliaceous plants. Mr. J. M. Adye exhibited two living examples of *Dipthera orion* (forced) bred from New Forest larvæ of 1892. This exhibit was made in metal boxes and a discussion ensued, Mr. Tugwell considering they would store heat and so make the enclosed insects restless, but Mr. Winkley said he had used this form of box for *Argynnis paphia*, &c., without harmful results. In further illustration of the phenomena of mimicry. Mr. Jenner Weir exhibited *Nebroda echaia* var. *jacksoni* which was closely mimicked by both a Nymphaline and Papilionine species, viz.: *Hypolimnas mima* and *Papilio cenea* ♀ the latter species being the southern form of *Papilio merope*, which was remarkable for the polymorphic and polychromatic varieties of the female. Mr. Weir also exhibited two other similar instances, species from Western Africa and Northern India being also mimicked by both Nymphaline and Papilionine species, and made some interesting comments thereon.

April 13th, 1893.—J. Jenner Weir, Esq., F.Z.S., President, in the chair. Mr. Edwards exhibited, through the President, a specimen of *Papilio jovindra* from the Himalayan region, Mr. Weir remarking that the species was a mimic. Mr. R. Adkin read an extract from an interesting letter addressed to Mr. Billups by Mr. T. D. A. Cockerell, from Jamaica, and exhibited the leaves containing the species of Coccidæ referred to. Mr. Manger exhibited *Dorippe japonica*, a crustacean from Japan. Mr. Adkin exhibited a small collection of sphinges and bombyces from Sutherlandshire, consisting of *Sesia scoliiformis*, *Arctia caja*, *Dicranura vinula*, *Orgyia antiqua*, *Nemeophila plantaginis*, and *N. russula*, the male specimen of which had smoky hind wings, and *Odonestis potatoria*, the coloration of the female being intermediate between the sexes. Mr. Perks showed a Bramble-leaf from Chessington, Surrey, corroded by a microscopic fungus. The Secretary, Mr. H. Williams, read a letter from Mr. Robson, of Hartlepool, requesting aid from members of the Society in filling up forms he had prepared asking for certain information as to meteorological conditions, &c., when sugaring for Noctuæ, and thus, by comparing results from different parts of the country, Mr. Robson hoped to come to some conclusion regarding some of the anomalies of this subject. Mr. Robson said he would be happy to send forms to any applicant for same. Mr. Turner reported the capture of *Eupithecia nanata*, *Fidonia atomaria* L. and larvæ of *Thera firmata*, *T. variata*, and *Ellopia fasciaria*. Mr. Carpenter said that *Thecla rubi* had been taken at Eynsford, Kent, on April 3rd, and *Syrichthus malvæ* on April 9th. The remainder of the evening was devoted to a long discussion with regard to the proposed excursions of the Society during the ensuing summer.—F. W. Hawes and H. Williams, *Hon. Secretaries.*

LANCASHIRE AND CHESHIRE ENTOMOLOGICAL SOCIETY.

April 10th.—The President (Mr. S. J. Capper, F.L.S., F.E.S.) in the chair. Mr. H. W. Bowler, Lisbon-road, Broadgreen, was elected a member of the society. Mr. John Watson read a paper entitled "Notes on three hybrid silk moths." The author, in speaking of these hybrids, stated that he had microscopically examined the female hybrids, and found them infertile, there being no trace of an ovary. He also stated that the hybrid larvæ spun double the weight of silk in forming the cocoon than either of the parents.—Dr. H. H. Corbett read a paper entitled "Notes on the lepidoptera of Doncaster." He enumerated the lepidoptera taken by him around Doncaster, and drew attention to the local variation of several species he exhibited and described.—*Lithocolletes cerasicolella*, a species new to the British list which had just been added by himself. Mr. Watson exhibited *Papilio elwesii* female from Central China, which, as far as he knew, was at present unique. The president exhibited *Papilio machaon;* and Mr. Newstead a collection of coccidæ formed by Miss Tomlin from Madras.—F. N. Pierce, *Hon. Secretary.*

NOTES
ON SOME OF THE RARER
HYMENOPTERA-ACULEATA
OBSERVED IN LANCASHIRE AND CHESHIRE.

BY WILLOUGHBY GARDNER, F.R.G.S.

Read before the Lancashire and Cheshire Entomological Society.

It is well known that many species of insects which have long been considered to be rare, have remained so merely because they were never looked for, or because observers were ignorant of their habits, and therefore did not know how to search for them.

This is especially the case in some of the less "popular" orders, such as the *Hymenoptera*.

Some attention has been paid to this order by two or three workers in the Lancashire and Cheshire Entomological Society, but their observations have as yet been confined to a very small area in the two counties, and records from new districts are much to be desired.

Now, even if a member of our Society does not intend to work specially at the *Hymenoptera*, he may yet do something by keeping his eyes well open during his Entomological rambles, *provided* he has first just a general idea of what information is wanted.

Many an Entomologist working in one particular order would be only too glad to keep specimens for friends interested in other orders, if he could only feel some assurance that he was not needlessly burdening both himself and his friends with examples of such species in their respective orders as *Xylophasia polyodon*, *Pterostichus madidus* and *Andrena albicans !*

With this end in view, therefore, the following brief notes may be of interest, and serve to give some idea to the ordinary observer, who is not a specialist in *Hymenoptera*, of " what to look for " in this order upon his expeditions in the country during the coming season.

There are several species of *Hymenoptera Aculeata* which are notable in, or peculiar to, Lancashire and Cheshire, and about which further information is much to be desired.

ASTATA STIGMA.

This is a small sand-wasp ; the females excavate little tunnels in the hard sand of the hills along our sea coasts and elsewhere ; they prey upon the larvæ of *Lepidoptera*. The insect is about three lines in length ; black, with abdomen red ; it is very similar to several near relations among the *Pompilidæ*, but the male, at any rate, may be at once and easily distinguished from them by the enormous size of its eyes ; the eyes of most of the sand wasps, and all of the *Pompilidæ*, occupy only a small space on each side of the head when seen from above ; in *Astata stigma*, however, they are so large that in the female they approach very close together, and in the male they actually touch, at the top of the head. The insect appears in June and July, and is fond of the hottest sunshine at mid-day, when it runs rapidly about on the bare sand often in company with various *Pompilidæ*. The species occurs in Finland and various places on the Continent, but has hitherto only been taken very rarely in this country. We have two records in our district ; the first capture was by the late Mr. B. Cooke on sandhills at Southport in 1879, and the writer was fortunate enough to take a second specimen on the Wallasey sandhills in 1891. Therefore, a sharp look out should be kept, in these two localities at any rate, during the present year for this little *Astata*.

OXYBELUS MUCRONATUS.

Another of the sand-wasps worth looking out for. Although it is allied to the sand-wasps by mode of life, it is not like them in appearance. The members of the genus *Oxybelus* prey upon *Diptera*, which they capture and store up as food for their offspring in the burrows which they excavate for deposition of their eggs; they are most striking examples of what is called "aggressive mimicry"; preying, as they do, upon *Diptera* of the small "house-fly" type (*Muscidæ*), they are most remarkably similar to quarry. Their mode of capturing their prey is curious; they have been noticed to alight upon the ground among a number of *Diptera*, and to run about among the flies pretending to be totally unmindful of them; in this way the foolish flies become accustomed to their presence, and allow them to approach quite close; suddenly, however, when the *Oxbelus* has well measured her distance, she darts upon the luckless fly, just as a cat springs upon a mouse, and carries off the unfortunate victim to her burrow! The genus *Oxybelus* is easily distinguishable from all other *Hymenoptera* by its fly-like appearance; there are several species of the genus, and *Mucronatus* can be separated from any of them by the fact of its body being covered with a silvery pubescence, which is absent in the other members of the genus. The insect occurs in June and July, at mid-day, when the sun is bright, and frequents the sandhills of our coasts. It is a scarce and local species, and was taken, apparently in some abundance, upon our Cheshire sandhills by Mr. Matthews, prior to 1836; it has been captured since in the same locality by the late Mr. B. Cooke. No one has, however, turned it up of recent years, it is therefore very desirable to re-discover it in our district.

COLLETES CUNICULARIA.

This is our far famed Wallasey Bee. It is fairly distributed round the sea coasts of Europe, but as far as this country is concerned, it appears to be peculiar to our home district, and is an insect of which we are consequently very proud. It is a large handsome bee, about the size of, and not unlike, a Hive Bee, when on the wing; even when hovering over the sallow bloom which it loves, it may easily be distinguished, however, from the latter species by its thinner legs; in the Hive Bee the broad flat hind legs hang conspicuously below the abdomen in flight, identifying it at once. If our *Colletes* be captured and examined, moreover, it will be found to have a broad, short, double-lobed flat tongue, like that of a wasp, for plastering purposes, instead of the long pointed tongue of the Honey Bee; *Colletes cunicularia* is, in fact, the only British bee of large size which has a tongue of this description.

The insect is one of the family of Plastering Bees; it burrows holes in the sandhills eight to ten inches long, which it plasters inside by means of its flat trowel-like tongue, and lines with a beautiful shining membrance; of this substance it forms a series of cells, one after the other along the burrows; in each of these cells an egg is deposited, with honey and pollen sufficient to feed the grub when hatched. The species usually emerges when the sallows on our sandhills are in full bloom, i.e. about the middle of April, and loves the bright sunshine. It was first discovered at Wallasey, and for many years was thought to be confined to that locality; subsequently, however, large colonies were found to exist at Hoylake, at Waterloo, and at Crosby, and single specimens have since been recorded from Southport and Blackpool in Lancashire, and Rockferry, and even Chester in Cheshire, pointing to the conclusion that it is really much more widely distributed than was for many years supposed. It would be well, therefore, if observers would keep well on the look out for it further afield, and report its discovery in new localities.

HALICTUS ATRICORNIS.

This is, even more than *Colletes cunicularia*, the *special* bee of our district; when first taken at Hazlegrove, near Manchester, by the late Mr. B. Cooke, the species was quite new to science; for many years, although it was freely taken there, and well known to Entomologists elsewhere by description, it was not found anywhere else in the world. During the last few years, however, the Rev. F. D. Morice, of Rugby, has discovered the species in his own neighbourhood, and taken it abundantly there; having, in consequence, obtained an intimate knowledge of the insect, and knowing "what to look for," he was successful in finding a few specimens at Whalley, in Lancashire. Mr. Morice informs me that a single specimen has lately been taken in Gloucestershire, but the insect has not been discovered anywhere upon the Continent; we may feel pretty confident, however, that, as in the case of many other species, it probably only wants thoroughly hunting for, to have its known distribution in the world much extended. It is unfortunately, not easy to describe in words what you are to keep your eyes open for in the present instance. The insect is very like many others of the genus *Halietus*, which are chiefly little black or dark coloured bees, of gregarious habits, burrowing several inches deep in banks or flat earth. The 31 species of which this genus consists have been tabulated by Entomologists for convenience of identification in a number of sections; the section to which *H. atricornis* belongs contains three species, which are black, and very polished and shining; one, *H. minutissimus*, is much smaller than the other two, but *H. minutus* and *H. atricornis* are, outwardly, very much alike; the latter is fractionally the larger of the two; structurally, however, the males, at any rate, are easily distinguishable by the form of the genitalia; in *H. atricornis* the apex of each of the stipites is produced into a curious narrow elongated process or stalk, with a little knob at its end, a peculiarity which at once separates it from any other species, and ensures its accurate identification upon examination with a lens. The females of this little bee appear first in May, and males and females are found together in August and September, when they are partial to the flowers of the blackberry; their burrows are excavated gregariously, in banks at the side of ditches along a high-road or elsewhere.

OSMIA XANTHOMELANA.

This insect belongs to the beautiful and interesting genus of Mason Bees; they are so called from their habit of constructing their nest cells, of diverse forms and in various situations, of mud, grains of sand, &c., cemented together by a kind of mortar secreted by the insect. These Bees belong to the sub-section called *Dasygasters*, or hairy bellied, the underside of the abdomen of the female being densely clothed with short hair, upon which the bee conveys the pollen from a rifled flower to its burrow. The *Osmias* may be roughly distinguished from the other genera by their medium to small size, mostly three-and-a-half to five lines in length, and by the oval shape of the abdomen. *O. xanthomelana* is one of three black species, the other two being distinguishable from it by somewhat minute characteristics, which cannot be gone into here. This bee may most easily be identified, however, by its very unique and interesting nest; this is usually constructed at the roots of grass, but occasionally in a hollow chamber about an inch under-ground. The cells are most beautifully constructed in the form of little pitchers; they are made of mud and small pebbles. These little pitchers are about five or six lines high, round at the bottom and flat at the top, closed with a cleverly made lid, which the bee constructs after it has laid its egg inside and duly provisioned the cell with honey and pollen for the nourishment of the future grub. A nest usually consists of four to six of these beautiful little cells, placed side by side. It may be mentioned "en passant" that the natives of the Fiji Islands are said to have copied their pottery from the model of a wild Bee's cell—probably an *Osmia* allied to our *Xanthomelana.* The species occurs in April and May; the nests are then constructed, and eggs laid, which duly develop to maturity by August or September; the perfect insect then emerges, and hybernates till spring; it is said to frequent, and to be very partial to, ground ivy. The life history of this interesting little bee was first worked out near Liverpool by Mr. G. Waterhouse, who took it in abundance at its nests here in 1835; it has since been taken at two or three other places in England, but is still a rare species; unfortunately none of our local collectors know where to find it in this district now, and it would be very desirable indeed to re-discover it in our neighbourhood.

There are, of course, many other species of *Hymenoptera-Aculeata* which it would be very interesting to have records of in our two counties—Lancashire and Cheshire; the above five species, however, are especially note-worthy, and it would be worth while for all Entomologists to keep well on the look out for them during the coming season.

General Notes.

Post-card Notes.—Do you not think a post-card question every month in your valuable Magazine would elicit much valuable information, which could be tabulated in succeeding numbers of the "British Naturalist"? For instance, "How has the warm, dry March influenced insect life so far as your experience goes!" Many would write an answer to such a question on a post-card who would never sit down to write a Magazine article. Post-card Competitions have been so successful in connection with weekly and monthly periodicals, that entomologists may well try the experiment.—W. Macmillan, Castle Cary.

[Post-card notes have no doubt been successful when prizes have been given in connection therewith. Mr. Macmillan's suggestion, however, is a very good one, *if readers will take it up*. I will find the space if they will supply questions and answers.—Ed. B.N.]

The Brambling in Worcestershire.—Among a number of little birds shot in a rick-yard of a farm in the parish of Bockleton, in West Worcestershire, one day in the latter part of February last, was a Brambling or Mountain Finch. This is the first time that this species has been noticed in that neighbourhood so far as I am aware. The specimen subsequently came into the possession of my sisters and has now been very nicely set up for them by Mr. Ashdown of Hereford. The other birds killed on the same occasion were nearly all Green-Finches and Yellow-Hammers. It is to be hoped that such useless and cold-blooded murder is not often perpetrated.—F. E. Prescott-Decie, 14, Kensington Gate, London, W.

Variety of Saturnia pavonia-minor.—I have bred a specimen of *Pavonia-minor* this spring, which has the left wings like those of the male except the costal margin of the hind-wing, and the right wings are like those of the female; the body resembles the female but small, the antennæ are more pectinated than the female but not so much as the male, the white blotch on the tip of the front wings is larger and brighter than usual, the span of wings is about the same as a large sized male. From the same brood I have also a cocoon with an opening at both ends. It contained but one pupa.—F. Milton, 184, Stamford Hill, London, N.

ANTHOCARIS CARDAMIKES.—I saw this insect on the wing on March 31st, and two specimens the following day. My earliest record previously is April 19th, 1892.—W. MACMILLAN, Castle Cary, Somerset.

LYCÆNA ARGIOLUS.—I encountered the Holy Blue (*Lycæna argiolus*) in numbers in this neighbourhood on April 16th.—W. HARCOURT BATH 195, Ladywood Row, Birmingham.

THE EARLY SEASON. GUERNSEY.—On March 3rd a specimen of *V. urticæ* was brought me which had flown into a school-room, and on March 5th I noticed several examples of the same species flying on the cliffs of our Southern coast. On the furze bushes, which were in bloom, several of the lady birds *(Coccinella 7 punctata, C. 11 punctata,* and *Chilochorus bipustulatus)* were abundant, and amongst the Hemiptera were *Pitzodorus lituratus*, and *Stenocephalus agilis*, two or the last named being in cop. Specimens of the non-British *Lygæus punctato-guttus* were to be found at the roots of fox-glove.—W. A. LUFF, Guernsey.

THE EARLY SEASON.—I do not know whether to bless the early season, or do the other thing. It entirely spoiled my visit to Bishop's Wood, Selby, at the end of March. The warmth had brought the sallows into bloom too early, in fact they were nearly over, and the moths did not seem to be fairly out. We had shaken about half-a-dozen *cruda* and one *populeti* when the keepers got on our track. They would not listen either to reason or to tips, so we had to turn out, which under the circumstances, didn't make much matter. If you go the right way about it, you can generally manage to get round a game-keeper. On April 1st, we went to Horden Dene, and got caught again, but after a short flare up, we got the man so interested in our sport, that he took us to some sallows we did not know of. We were spending the week end at Dene Holme, and got the usual species, *T. gothica, stabilis, instabilis, rubricosa*, and *cruda ;* also *C. vaccinii* and *S. satellitia*, and netted plenty of *L. multistrigaria* and *A. badiata.* We tried some sallows along the sea banks in hopes of one or two *opima*, but in vain. On Sunday I was pleased to get half-a-dozen beautiful specimens of *A. prodromana*, and another at Ryhope on Good Friday.—L. S. BRADY, Sunderland, 6th April, 1893.

SALLOWS IN THE ISLE OF MAN.—The Sallows here are, and have been for the past fortnight in splendid condition for working. I have worked almost nightly in the vicinity of Sulby, and have also sugared there. *T. gothica* has swarmed as usual at sallow bloom, whilst *instabalis* and *rubricosa* have appeared but sparingly. Several of the "Thorns" have also been captured whilst hovering about the blossoms. The nights have been somewhat cold, and insects in this part of the Island have not turned up in such numbers as last year. Sugaring has yielded *satellitia* only.—H. SHORTRIDGE CLARKE, Sulby Parsonage, Lezayre, Isle of Man, April 10th, 1893.

Pres.

MUSEUM NATURAL HI

EXCHANGE.

Exchange.—Wanted—Magic Lantern Slides of Insects of any order, and either eggs, larvæ, pupæ, perfect insects, or dissections desired. Will give Lepidoptera in return, or Cash.—John E. Robson, Hartlepool.

Duplicates.—Pudorina, Umbrosa, Immutata, Statices, Cratægi,* Anachoreta,* etc. Desiderata—Rufina, Lota, Spadicea, Fimbria, Croceago, Citrago, Dahlii, Haworthii, Saucia, Subtusa, Oxyacanthæ (dark), Herbida, Rhizolitha, Myrtilli, Parthenias, Verbascalis, etc.—J. W. Tutt, Westcombe Hill, S.E.

Exchange.—Marine Shells from New Zealand offered for foreign land and fresh-water shells, Microscopic slides illustrating useful or noxious insects, or botanical or entomological lantern slides.—W. A. Gain, Tuxford, Newark.

Desiderata.—Ferrugata from all parts of the country. Will pay postage or make a return if in my power.—Louis B. Prout, 12, Greenwood Road, Dalton, N.E.

Exchange.—Wanted—Living pupæ (or empty cases) of Skippers, Psychids, and Hepiali, also larvæ and pupæ of Elachistas and Elachistids, and pupæ or cases of many Tineina and others. Will do anything I can in return.—T. A. Chapman, Firbank, Hereford.

Exchange.—A few fine Aphodius tessulatus.—B. Tomlin, The Green, Llandaff.

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A considerable number of communications are unavoidably held over for want of space.

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THE PTEROPHORINA OF BRITAIN.

BY. J. W. TUTT, F.E.S.

(Continued from p. 97).

Leioptilus microdactyla, Hb.—This interesting, little, double-brooded species is not at all uncommon in most localities where *Eupatorium* abounds.

SYNONYMY—*Microdactyla*, Hb., 26-27; Tr., IX., 2, 248; Zell., 'Isis,' 1841, 854; 'Linn. Ent. Zeit.,' VI., 388; Dup., IV., 88, 12; H.-S., V., p. 380; Frey, 417; Sta., 'Man.,' II., 443.

IMAGO—There is a very great deal of difference in the size of the specimens of this species, the smallest specimens being only about four lines in expanse whilst some of the largest are eight lines, or as large as *osteodactylus*. These small specimens are generally found among those of the early brood, although specimens of the autumn brood are also sometimes much below the average size. I took a large number of specimens in May, 1890, at Kingsdown, near Deal, and among these are some of the smallest and also some of the largest individuals in my collection. This variation in size is therefore in no way entirely seasonal. The fore-wings of this species are divided into two lobes; the apex acute; the colour, sometimes of as bright a sulphur yellow, as in *osteodactylus*, is at others much greyer; some specimens are faintly powdered with minute dark scales, while at other times it is quite devoid of them; there is usually a black dot on the disc and another at the end of the cleft with a costal spot directly above the latter; the upper lobe has a small dot near the apex and there are three other very minute ones in the lower lobe. The hind-wings are divided into three plumules, and are of an unicolorous pale greyish colour. This is another of Hübner's species. His figures may be described as:—"Fig. 26. ♂. Anterior wings pale sulphur yellow, suffused with black atoms, with a black dot on the disc." Stainton's diagnosis is as follows:—"Fore-wings pale sulphur, dusted with brownish, with a small brown dot before the fissure, two small brown dots on the costa beyond it, and some brown dots round the tips of both lobes" ("Manual," Vol. II., p. 443). A figure of this species, its larva and pupa are to be found in the "Entomologist," Vol. XV., Pl. 2, figs. 1, 1*a*, 1*b*, 1*c*.

LARVA—The larva of the summer brood feeds in the flowering stems of *Eupatorium cannabinum* generally at the axils of the leaves on such stems. It has all the characters of an internal feeder having the legs ill-developed, and the segments provided with rough projections or hooks apparently to aid its movements in its burrow, whilst the colour is brownish and the skin somewhat shiny. Stainton gives "larva in the blossoms of *Eupatorium cannabinum*" an error which appears to have been copied by Mr. South, who writes:—"Food, *Eupatorium cannabinum.* Feeds on the flowers" ("Entomologist," Vol. XV., p. 103). Mr. Buckler gives the following full description of the larva in its various stages of growth, together with some general notes on the habits of the insect in this stage. He writes:—"To Mr. W. H. Grigg, of Bristol, I have been indebted for the good opportunity afforded me of studying this interesting plume larva, by his very kindly sending me a number of examples on the 26th July, 1875, which, two days before, he had found in the flowering stems of *Eupatorium cannabinum.* Mr. Grigg also acquainted me with his having taken, at the same time and place, nine fresh specimens of the moth, at the very spot where they occurred plentifully in May of the previous year, hence he inferred the insect to be double-brooded. I found it no easy matter to keep the stems, in which these larvæ were living, from either drying up or turning mouldy; from these mishaps, and from the larvæ refusing to enter the fresh stems provided for them, most of the number died—however, I was at length well pleased at being able to breed three specimens of the moth on August 8th, 9th, 19th, and a fourth a fortnight later, thus satisfactorily proving their identity. Most of these larvæ were mining, singly, within the stems, near to the axils of the leaf stalks, though three or four had their mines situated midway between the axillary branchings near the top of the plant, the small hole at the entrance of a mine is not very readily detected, for although frass is probably extruded from it, especially at first, yet I found none hanging outside the entrance, and only a fine dust at the bottom of their cage gave evidence that a small quantity must occasionally have fallen out of the holes; the mines always appeared lightly filled up from within, just level with the surface of the stem, and so the orifices not contrasting much in colour, were not very conspicuous from being no more than one-sixteenth of an inch in diameter. The youngest larva examined I found to be just one-eighth of an inch long, and possessed of all the details of form, colour, and other characteristics that so well distinguished this species of *Pterophorus* from any I have as yet seen, inasmuch as it is furnished with rough points or hooks, in many respects much like those we know so well on the pupæ of *Cossus* and of *Hepialus*; doubtless these are both for support and progression within the very tough stem where it resides. The full-grown larva is one quarter of an inch in length, plump in proportion, in general figure somewhat cylindrical, but tapering forwards to the head, which is smaller than the second segment, the last three segments also tapering to the anal tip; the anterior legs are but little developed, while the ventral and anal legs are so exceedingly small as to be with difficulty detected even with a lens; the segments are well defined, the first third of each, after the thoracic segments, is clean cut backwards with an upward slope, and the summit of this slope is crested with a row of minute rough points, or blunt hooks, extending unbroken across the back, rather near towards the spiracular region; on the middle portion of the remainder of each of these segments is a broadish oblong transverse band of the rough points dorsally divided by a naked, or nearly naked, interval of smooth skin; similar points occur also across the thoracic segments, but in a narrower shape and on the second they fill up the usual form of plate there; those of the twelfth segment, and the front of the thirteenth are very much coarser, and closely aggregated. The colour of the shining head is light yellowish-brown, tinged with deeper brown on the crown of each lobe, the ocelli and mouth darker brown again; the body is of a slightly livid flesh colour, becoming a trifle paler and yellower on the three or four hinder segments; a distinctly paler dorsal line is visible, and bisects both the bands of blackish rough points, and the anterior plate of them, though on this last it is a mere fine thread; the skin generally is smooth, and glistens a little; the spiracles are circular, a trifle raised, wart-like, brown in colour, with a whitish centre; above each spiracle is a wart-like tubercular slight eminence, on the sloping surface, in front of the segments, are a pair of transversely elongate oval black-brown rough spots; the anal tip is dark brown" ("Entomologist's Monthly Magazine," Vol. XII., pp. 234-236). So much for the life-history of the summer brood. The moths, which emerge in August, appear to lay their eggs at once and to feed in a similar manner to the first brood, but beyond the statement of Mr. South which I have quoted below, the correctness of which was challenged by Mr. Bignell and which is certainly erroneous in some particulars no record of the hybernating larva seems to have appeared. The pupation of the hybernating larva, however, takes place very early in the year and these autumn and winter larvæ produce imagines towards the end of May. In the "Entomologist," Vol. XV., p. 103, Mr. South says the "larvæ feed on the flowers of *Eupatorium cannabinum*" and adds:—"The larva hybernates on branches or stems of its food-plant, the common hemp agrimony. It makes a hole just below one of the joints, and gnaws its way upwards for about half-an-inch above the joint; here it prepares a snug chamber, in which it remains as a larva until April, when it turns to a pupa. When, as sometimes happens, a larva pierces the stem midway between the joints, a slight thickening of the skin etc., is observed just above the hole" ("Entomologist," Vol. XV., p. 103). This was a strange blunder after Mr. Buckler's previous lucid description of the larva and its habits, and not only was the error of feeding on the flowers incorrect, but, the method of pupation described appears to be equally erroneous, as it certainly hybernates in the burrow in which it feeds. Regarding the errors in Mr. South's life-history Mr. Bignell writes :—"It has been stated that the larva of *A. microdactylus* feeds in or on the flowers of *Eupatorium cannabinum;* I feel quite certain that it feeds in the stem immediately below. In many cases the plants attacked can be at once distinguished from the dwarfing of the central head of blossoms, caused by the attack of the larva on the terminal portion of the stem having been made when it was so tender, so that the side bunches of flowers over-reach it. In ordinary circumstances the head of blossoms is all on the same plane. When the stem is attacked lower down, where it is harder, the blossom is not affected. If the larva fed on the flowers and afterwards entered the stem, I doubt very much whether there would be any swelling in the stem, as the plant has ceased to grow when in full bloom. Yesterday, I found a larva in a stem that was not in flower, and I doubt very much its having come from another plant. In some plants I have been able to see a small hole above the joint, where I should think the larva first entered; and the reason why the hole below is so much larger is evidently to enable the larva to turn out its frass." The editors add :—"The history of this species was detailed by Mr. Buckler, in Vol. XII. of the Magazine, pp. 234-236. He found the larvæ in the stems, even in a very young stage, but his account was not drawn up absolutely *ab ovo;* so far as it goes it agrees altogether with Mr. Bignell's observations" ("Entomologist's Monthly Magazine," Vol. XXI., pp. 110-111). Mr. South in the "Entomologist," Vol. XVII., pp. 259-260, acknowledged his error of observation and agreed with Mr. Bignell that the larvæ did feed in the stems.

PUPA—Strange to say this species also pupates in the stem, clearing out a little chamber and attaching itself, as is common in the family by its anal segment. Mr. Buckler writes :—"On August 2nd, I opened a stem and found the pupa lying in a small cleared space just above the middle of the mine, its head uppermost in a slanting direction towards the entrance, its tail steadied by a few threads spun on some frass, of which the mine below was full, there was some also above, and a little about the entrance, dry and mixed with silk; the pupa itself was a quarter-of-an-inch long, rather slender, the thorax rounded and well defined, emitting a few bristly hairs, the head and eyes rather prominent, wing covers long, the leg cases reaching to the penultimate abdominal ring from which they hang free; on the abdomen were sub-dorsal, lateral, and sub-spiracular rows of blunt hook-like processes, in pairs, those on the last ring the most projecting; the whole surface rather glistening; and the colour a dark bronzy-green" ("Entomologist's Monthly Magazine," Vol. XII., p. 236).

HABITAT—This interesting little species does not seem to be particular as to its habitat. I have found it abundantly in Wicken Fen,

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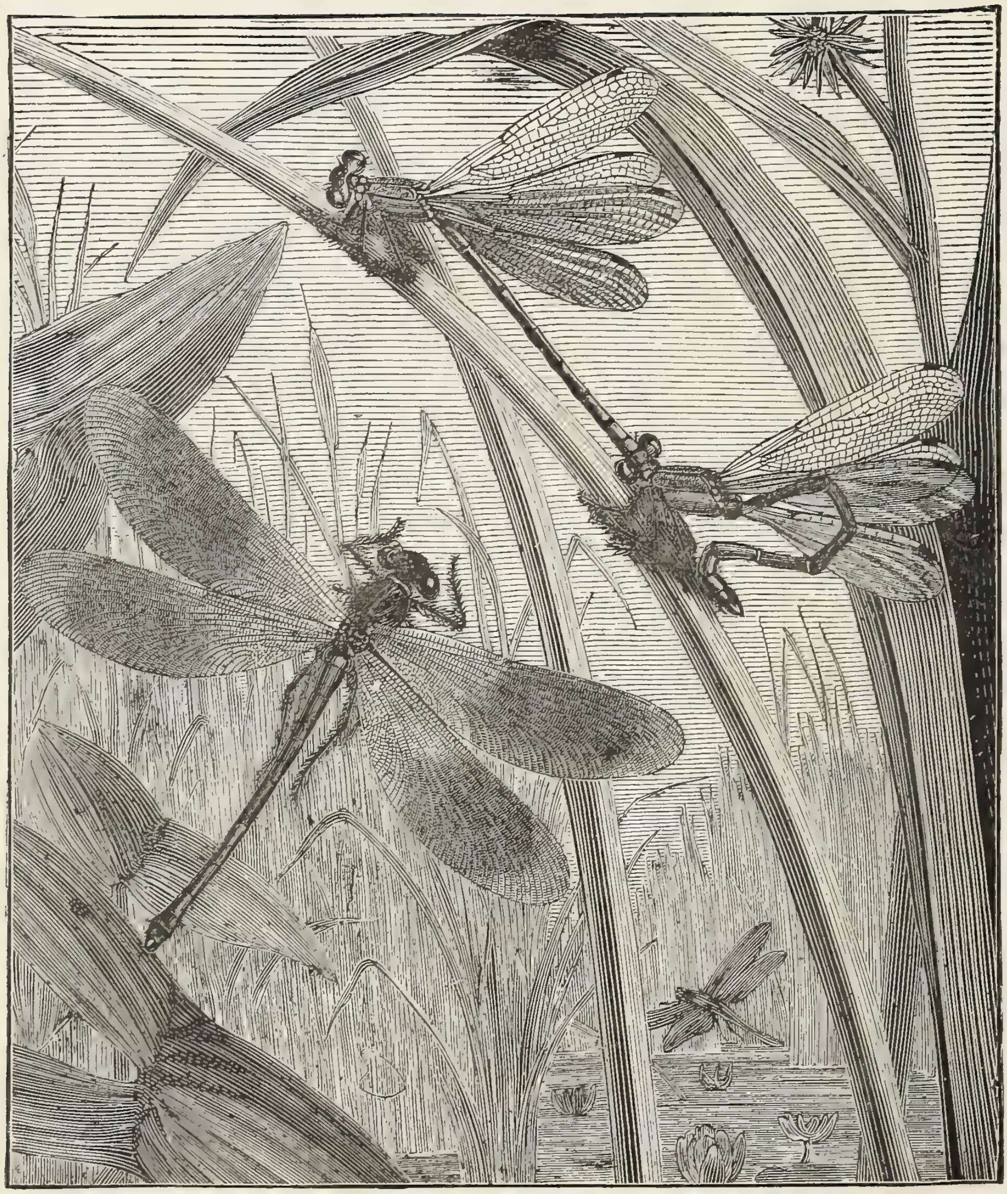

A FLIGHT OF DEMOISELLES AND AGRIONS.

Reprinted from "An Illustrated Handbook of British Dragonflies."

in the marshes bordering the Yar in the Isle of Wight, in the marshes at Deal; on chalk downs facing the sea at Kingsdown, near Deal, and many other localities, but most of the records are from the southern half of the English counties, although as a Swedish insect it might be expected from our more northerly districts. Stainton gives "Alkham, Bristol, Cambridge, Pembury and Scarborough (very common)" as the localities he knew for the species. Mr. Porritt also records it from the "Isle of Man" *(in litt.)*. Staudinger and Wocke give a wide range:—"Livonia, Sweden, Germany, Switzerland, England, Carniola, Central Italy, Sardinia and Bithynia" ("Catalog," p. 344).

TIME OF APPEARANCE—The perfect insect first appears towards the end of May and is on the wing only a short time, from two to three weeks. In 1890, I found this brood very abundant ("Entomologist's Record," Vol. I., p. 65) during the last week in May. The second brood begins to appear in July, but is most abundant during the first fortnight of August, continuing, however, till the end of the month. Stainton only gives "May and June" in the "Manual" as the time of appearance, the second brood apparently not being then known.

DEMOISELLES AND AGRIONS.

BY W. HARCOURT BATH.

Author of "An Illustrated Handbook of British Dragonflies," &c., &c.

One of the most charming sights which any enthusiastic entomologist can witness in this country, is undoubtedly a view, in their native haunts, of those superbly elegant and graceful insects, the Demoiselles and Agrions, engaged in their äerial peregrinations.

We have, in the British Isles about a dozen different species of these pretty Dragonflies of common occurrence, in addition to some five or six other kinds of rare or doubtful appearance.

The section to which the Demoiselles and Agrions belong, is distinguished from the typical division, by its representatives possessing hammer-shaped heads, with their eyes remote from each other; their wings are also of uniform size and their bodies are all exceedingly slender.

The *Calopterygidæ* which contains the Demoiselles, are distinguished by having coloured wings, containing an immense number of nervures or veins, while the other family, namely the *Agrionidæ* or Agrions, never have their wings coloured, and they are small species compared with the former group.

Most of these pretty Dragonflies make their appearance during the early summer months, the time when they are to be seen in the greatest abundance, being from the end of May to the beginning of

July. The Agrions chiefly frequent boggy ground and moist meadows in the vicinity of some stream or pond. In similar situations we may also encounter the two lovely Demoiselles, *Calopteryx virgo* and *C. splendens*.

Both of the latter insects, however, possess a special predilection for brooks and shady streams in woods and forests, where they may frequently be seen flying about in all their glory, their beautiful wings glittering in the sun just like two pairs of fan-shaped pearls.

In the New Forest in Hampshire, Wyre Forest in Worcestershire, as well as in many other "happy hunting grounds" in this country, I have frequently been an admiring witness to their fairy-like flight—which however I have fully described in my little work on these interesting insects. In the accompanying plate a very typical Dragonfly scene is depicted and one which I have no doubt every practical Dragonfly hunter has witnessed upon many an occasion when in pursuit of these winged gems. Although it is not supposed to represent any place in particular it bears a very close resemblance to at least two or three delightful spots in the New Forest which I have visited. The largest specimen represented on the plate is a male individual of the beautiful Blue-banded Demoiselle (*Calopteryx splendens*) which, as its popular name implies, posseses a bluish band in the centre of its wings, the apices and bases being hyaline; in the female, however, the wings are uniformly of a pale greenish colour. In both sexes the thorax and abdomen are of a magnificent metallic blue or green. (The other species of Demoiselle which is not represented, namely, the Steel-blue Demoiselle *(Calopteryx virgo)* has its wings entirely blue in the male, brownish in the female, their body also being adorned with the same brilliant colours as their relative).

The smaller species depicted in the engraving is the Crimson Agrion *(Pyrrhosoma minium)* a very common and familiar species of Dragonfly, of a bright red or crimson colour, spotted and banded with black and yellow. This species, in company with several other sorts belonging to the same family, may sometimes be encountered in scores in damp situations during the months of May and June, and when disturbed will occasionally rise up in clouds from amidst the tall herbage which affords them shelter, their transparent wings glittering in the sunshine with a splendid iridescence of colouring. A detailed description of all these interesting insects together with a full account of their habits and metamorphoses, &c., will be found in my "Illustrated Handbook of British Butterflies."

In conclusion I may say that I shall be very pleased at all times to name and identify any specimens of Demoiselles, Agrions and other British Dragonflies which readers of the "British Naturalist" care to forward to me for that purpose, provided stamps for the return postage be sent.

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Reports of Societies.

ENTOMOLOGICAL SOCIETY OF LONDON.

May 10, 1893.—Henry John Elwes, F.L.S., F.Z.S., President, in the chair. Mr. A. Cowper Field, of 81, Wiltshire Road, Brixton, S.W., was elected a Fellow of the Society. Mr. R. McLachlan exhibited, for Dr. Fritz Müller, of Blumenau, Santa Catarina, Brazil, specimens of larvæ and pupæ of a dipterous insect, *Paltostoma torrentium*, and read a letter from Dr. Fritz Müller on the subject. The writer stated that these larvæ were of the same nature as those exhibited by Mr. Gahan, at a meeting of the Society in October, 1890, and which were then thought by Lord Walsingham and Mr. McLachlan, to be allied to the Myriapoda. Mr. Gahan, Mr. Jenner Weir, Colonel Swinhoe, Mr. Blandford, Mr. Verrall, Mr. Slater, and Mr. Jacoby took part in the discussion which ensued (*cf.* Proc. Ent. Soc. 1891, p. ii.). Mr. S. G. C. Russell exhibited *Hesperia alveolus*, variety *Taras*, taken by him at Woking in April last. Mr. J. M. Adye exhibited a long series of *Moma orion*, *Eurymene dolobraria*, *Amphidasis betularia*, and *Chloephora prasinana*, and a few specimens of *Notodonta dodonea*, *N. chaonia*, and *N. trepida*, *Acronycta alni*, and *Selenia illustraria*, all bred by him in March and April last, from larvæ obtained in the autumn of 1892 in the New Forest. Mr. H. Goss read a copy of a letter received by the Marquess of Ripon, at the Colonial Office, from the Governor of the Gold Coast, reporting the occurrence of vast swarms of locusts at Aburi and Accra, West Africa, about the middle of February last. The writer stated that at Accra the swarm extended from east to west as far as the eye could see, and appeared to occupy a space about two miles wide. Colonel Swinhoe stated that some years ago he had been requested by the Indian Government to report on plagues of locusts. He said he had witnessed swarms of these insects far larger than the one just reported from the Gold Coast, and mentioned that many years ago, when going up the Red Sea in one of the old P. and O. paddle-boats, the boat had frequently to stop to clear her paddle-wheels from locusts, which had settled in such swarms as to choke the wheels and stop their action. Mr. C. G. Barrett called attention to a field excursion to the Cotswolds which it was proposed to have in June. Fellows of the Society were requested by the President to communicate to Mr. Barrett, as early as possible, their views as to the date which would be most generally convenient for such excursion, and to offer any other suggestions on the subject which might occur to them. Mr. E. C. Reed, of Valparaiso, Chili, communicated a paper entitled "Notes on *Acridium paranense*, the migratory locust of the Argentine Republic." Colonel Swinhoe, Mr. Champion, Mr. Elwes, Mr. McLachlan, and Mr. Merrifield took part in the discussion which ensued. Professor L. C. Miall communicated a paper entitled "Dicranota; a Carnivorous Tipulid Larva." Dr. T. A. Chapman communicated a paper entitled "On a Lepidopterous pupa *(Micropteryx purpurella)* with functionally active mandibles." Mr. McLachlan said Dr. Chapman's observations were of great value, and tended to show that the position of *Micropteryx* was still nearer the Trichoptera than had been supposed. The President announced that the new Library Catalogue, which had been edited by Mr. Champion, with the assistance of Mr. McLachlan and Dr. Sharp, was now ready for sale to the public at 9s., and to the Fellows of the Society at 6s. a copy.—H. Goss, *Hon. Secretary.*

THE SOUTH LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY.

April 27th, 1893.—J. Jenner Weir, Esq., F.Z.S., President, in the chair. Mr. Tutt exhibited a series of *Tapinostola concolor* from Cambridgeshire, and remarked upon the extremely restricted range of this species, and in how very few localities it had been taken in any number; Mr. Tutt also pointed out the confusion that had arisen with regard to the nomenclature of this insect in consequence of Hubner's figure of *T. extrema* having blackish cilia. Mr. Weir mentioned that specimens of *Polyommatus dispar* had fetched £6 each on Tuesday last, at Steven's Auction Rooms. Mr. W. H. Wright exhibited a very long and variable series of *Bombyx castrensis*, bred from larvæ captured on the banks of the Medway, and mentioned, that his experience was, that unless the larvæ were, say, within about a week of being full fed when captured, they usually refused to feed and seldom came to perfection. Mr. R. Adkin and Mr. Tutt both corroborated this view, stating this species was especially resentful to a change of habitat. In proof of the recent extraordinarily fine weather, Mr. Tutt mentioned that *Melitœa cinxia* and other June species were on the wing in Guernsey, and that *Lycæna argiolus*, were flying at Hereford during the first week in April, and Mr. R. Adkin noted the rare occurrence of the Blackthorn *(Prunus spinosa)* and Whitethorn *(Cratægus oxyacantha)*, being in blossom at the same time. In the course of some remarks upon *Colias edusa*, Mr. Tutt said it ought to have had a good chance of hybernating here this last winter. In Algeria and Morocco, it could be got in all its stages, with the exception of the egg, nearly the whole year through, and that in the Mediterranean littoral, it practically did not hybernate at all, but one brood followed the other in rapid succession.

May 11th, 1893.—Charles G. Barrett, Esq., F.E.S., Vice-President, in the chair. Mr. R. South exhibited a series of *C. fagella*, from Buckinghamshire, the light and dark forms being about equal in number. Mr. South said that the trees in the wood in which they were taken were darker on their western side than on their eastern, and at the time he collected these specimens the wind was in the east and most of the moths were at rest on the western side of the trees, the dark insects being inconspicuous and he thought that if this often happened when this species was on the wing, it would, by natural selection, tend to produce a darker race. Mr. Barrett, in referring to the breeding of *B. castrensis*, in captivity, said the larva should be well wetted at times and exposed when possible to the sun; and he thought the absence of the latter in some years might account for the uncertain appearance of this species. Mr. Turner said that he had bred *B. castrensis* very successfully on rose leaves dipped in salt water, the discussion being continued by Messrs. Tutt, Frohawk, and South. Mr. Adye exhibited a long series each of *D. orion*, *D. dolobraria*, *A. betularia*, *H. prasinana*, &c., and odd specimens of *A. alni*, *N. chaonia*, *N. dodonea*, *N. trepida*, &c., the majority having been bred in March or April indoors, from larvæ taken in the New Forest last autumn. Mr. Tutt said that on May 6th, *N. plantaginis*, *E. glyphica*, &c., were on the wing in Kent, whilst pupæ and larvæ of *V. urticæ* were reported for the same date. Mr. Jager mentioned that *C. russata* was now emerging, and Mr. South said he had bred *C. strobilana*, from the Spruce Fir in Buckinghamshire.—F. W. Hawes and H. Williams, *Hon. Secs.*

CITY OF LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY.

Tuesday, May 2, 1893.—Exhibits. Mr. Clark, *Nyssia hispidaria* with a pale hind marginal band, a pale grey specimen of *Tæniocampa instabilis* with a dark central band and *Notodonta chaonia*, all from the New Forest. Mr. Oldham, *Trachea piniperda*, the dark form of *Tæniocampa instabilis* and *Brephos parthenias*. Dr. Buckell, series of *Polia* *chi* from various localities, including the var. *suffusa* from Sheffield. Mr. Hollis, melanic specimens of *C. fagella* from Highgate. Mr. Battley, a variable series of *Tæniocampa munda* from Epping Forest. Capt. Thompson, a living larva of *Geometra papilionaria.* Mr. Adye, a series of *Boarmia repandata* from the New Forest, including some fine specimens of var. *conversaria.* Mr. Tremayne, living larvæ from Epping Forest, including *Nola cuculatella, Himera pennaria* and *Miselia oxyacanthæ.* Mr. Bacot, *Amphidasys prodromaria, Tæniocampa populeti*, and a pale variety of *T. instabilis*, all from Epping Forest. Coleoptera: Mr. Heasler, a series of *Anchomenus thoreyi* from the Plumstead marshes. Mr. Lewcock, a living larva of *Pulex irritans.* Mr. Tutt then read his criticism on Mr. Robson's paper on "Melanism," after which a discussion ensued, in which Drs. Buckell and Sequiera, Messrs. Lewcock, Bacot, Battley, Clarke and others took part.

Tuesday, May 16, 1893.—Exhibits. Mr. Smith, *Eurymene dolobraria* and *Ephyra trilinearia* from Epping Forest, one of the latter having the outer line on the fore-wings developed into a band. Mr. Battley, living larvæ of *Agriopis aprilina* from Rugby, and nine specimens of *Amphidasys betularia* taken at Stamford Hill, by "assembling" on the previous evening between 8.30 and 10 o'clock. One of these was very dark, and closely approached the var. *doubledayaria*, the remainder being normal. Mr. Prout, *Anticlea derivata* from Epping Forest and Darlington, the latter being slightly darker. Mr. Clark, bred series of *Lithosia aureola* and *Hypsipetes ruberata*, and living specimens of *Melitœa artemis.* Mr. Bayne, *Tæniocampa leucographa* from Aylesbury, and variable series of *T. munda* and *T. instabilis* from Epping. Mr. Lane, a series of *Papilio machaon.* Mr. Riches, living larvæ of *Agrotis nigricans.* Coleoptera: Mr. Burrows, *Blethisa multipunctata, Clytus mysticus*, and *Philonthus quisquilarus* var. *dimidiatus*, from Hendon. Messrs. Lewcock and Heasler exhibited specimens of the genus Silpha to illustrate the paper. Mr. Lewcock then read, on behalf of Rev. W. F. Johnson, of Armagh, and himself, a paper on "The Genus Silpha," giving special notice of *Silpha atrata* and its vars. *brunnea* and *subrotundata.* A discussion then ensued, and a vote of thanks to Mr. Lewcock and Rev. W. F. Johnson concluded the proceedings.

LANCASHIRE AND CHESHIRE ENTOMOLOGICAL SOCIETY.

May 8th, 1893.—Mr. S. J. Capper, F.L.S., F.E.S., President, in the chair. Mr. Robert Newstead, F.E.S., communicated a paper entitled "On a successful method of rearing *Deilephila galii*," in which he gave his experience of rearing this species in 1888, and stated that cold was fatal to the larva, and that forcing was absolutely necessary for the pupæ. The author also added some notes on "Lepidoptera attracted by honey dew." The president exhibited some fine varieties of *Boarmia rhomboidaria.* Mr. Collins, *Hadena suasa* and a Lancashire specimen of *Boarmia abietaria.* Mr. Deville, African Pieridæ. Mr. Sharp, Coleoptera from Wales. Dr. Ellis, coleoptera from Grahamstown, South Africa. Mr. Stott, a pretty piebald variety of the water shrew *Crossopus fodiens*, var. *remifer.* Mr. Watson, *Papilio macleayana* and *P. sarpedon.*—F. N. Pierce, *Hon. Sec.*

GUERNSEY NATURAL SCIENCE SOCIETY.

The first weekly excursion for the present season in connection with the above Society, took place on Tuesday, May 9th, when the members paid a visit to Houmet Paradis, and explored that very interesting islet and its neighbourhood.

Wednesday, May 10, 1893.—The monthly meeting of the Society was held at the Guille-Allès Library, when the results of the excursion were discussed, and a valuable paper was read by Mr. A. Collenette, on "Drought in Jersey during the last Fifty Years." Major-General Harvey was elected a member of the Society. Mr. W. A. Luff exhibited a male specimen of *Anthocharis cardamines*, the orange-tip butterfly which he captured on April 23rd, at a marshy spot called La Grande Mare, on the west coast of the island. This is the first record of its capture in Guernsey.

[This Society have issued a most interesting programme of weekly excursions, every Tuesday, and will always be pleased to see visitors.—Ed. B.N.]

THE GENUS RISSOA (CONTINUED).

BY BROCKTON TOMLIN.

Sub-genus *Alvania*, Risso.

This group was suggested to Risso by the well-known English conchologist Leach in 1826, when the latter was staying in the south of France. Within its limits, as usually understood, is comprised by far the largest proportion of the European species, and also of our British representatives. The usual type of the sub-genus is taken to be *Rissoa cimex*, L.—a well-known Mediterranean species but not included in our fauna. The new school of conchologists has not been backward in chopping up so extensive a group as this (there are at least 40 palaearctic species): it seems to offend their eye to see more than half-a-dozen species in one group. Their vagaries will be noted in dealing with the several species. With Jeffreys we place the following nine British *Rissoas* in the group *Alvania*:—*striatula*, *lactea*, *cancellata*, *calathus*, *reticulata*, *cimicoides*, *jeffreysi*, *punctura*, and *abyssicola*. They are well distinguished by the feature of cancellation, generally resembling a beautiful and delicate lattice-work, which requires in the smaller shells a glass of some power for adequate appreciation. Here also the largest shells of the genus find a place: they are difficult to get alive, but the four first-mentioned, at any rate, *can* be taken alive in the Channel Isles between tide-marks. The outer lip is usually strengthened by a rib, and sometimes notched within. We will now turn to the several species in the above-mentioned order.

Rissoa striatula, Montagu (1803) ought undoubtedly to bear the name of *R. carinata*, Da Costa. The former name is due to the erroneous identification of this shell with a Linnean species and Da Costa's name has precedence of Montagu's by 24 years. It is an unmistakable shell with three very marked spiral keels, the lattice-work being very fine and indistinct in this species except on the freshest specimens. These keels give the shell its name of *carinata* (Lat. carina=" keel ") and are not found in any other species; hence a special, but hardly necessary sub-genus proposed in 1884 for this shell, called *Galeodina*, Monts. In size it averages 4 to 5 mm., and the colour of a live shell is white, with a slight yellow tinge. The dead shells usually seen in collections, however, are of the purest white. The three keels of this shell are frequently very unequal in size, and are accompanied by other smaller ridges. A form occurs with the keels and ridges more equal in size and arranged regularly to which the varietal name has been given of *ecarinata*, Monts. This var. is most frequently found with varices and probably the var. *varicosa* Mar. of Mr. Somerville's marine list is a synonym, though I am not aware of any description of it beyond the mere name. This is undoubtedly a rare shell with us, though it seems to be of universal occurrence in the Mediterranean, but I fancy that in its known localities it only wants looking for to be turned up in some numbers alive. My experience of it is confined to the Channel Isles, and its habitat is most usually under stones which are *rather deeply buried* in the sand, to which it moors itself by a strong byssus. There is quite a special population in this kind of habitat, and it may surprise some collectors to know that it is any use turning up the stones which are firmly embedded in the ground, and apparently offer no facilities of ingress or domicile to Mollusca. And yet here is the native haunt of a small number of very interesting species. Under stones which are so buried about half way up the shore occur *Alexia bidentata*, *Rissoa cingillus* and *R. striata* very commonly, while at extreme low-water one gets in Guernsey and Herm at any rate *Adeorbis*, *Chiton scabridus*, *Rissoa striatula*, and *Lima hians* var. *tenera*; in Jersey *Rissoa lactea* also is not scarce, though called by Jeffreys our rarest *Rissoa*. I have seen 14 *striatulas* on a single stone but this was an exceptional haul. As for *Chiton scabridus*—a species which seems very little known to collectors—it is abundant in this habitat and assiduous collecting for a couple of weeks is sure to produce 50 or 60.

Rissoa lactea, Mich., the next species on our list, can be soon dismissed. It is like the preceding species in being quite removed from any other species in the genus, and consequently is relegated by the authors of the "Moll. Marins du Rousillon" I. 298 to a new subgenus *Massotia*. It bears, however, a sufficiently close resemblance to the contour and sculpture of the *Alvanias* to be merged with them. The characteristics are a remarkably oval form, with a last whorl taking up three-quarters of the shell and a spire almost sunk. The sculpture is a slight and fine lattice-work and distinguishes it at once from the other species (*cancellata*, etc.), which have a disproportionately large last whorl. The species on the other hand which have fine sculpture (e.g. *punctura*, *reticulata*) will be known from *lactea* by a pronounced pointed spire. Colour very much as in *striatula*: size 5—6 mm.

Varieties: *var. major*, Requien.
var. minor, Requien.

I am not aware of the requisite proportions of these rather unnecessary vars., as they are not given in any book to which I have access. The habitat of this shell has been above referred to.

Llandaff.

SUGARING.

BY JOHN E. ROBSON, F.E.S.

In the April issue of this Magazine I made a suggestion for united observation in connection with sugaring, in the hope that by such united observation made on a uniform plan, and at various places, we might find some solution of the puzzles connected with the success or failure of this mode of attracting insects. Forms were prepared, and have been distributed in considerable numbers, and now that some of them are beginning to come in, it seems desirable to add a few words more.

Whilst the number who have applied for these forms, and expressed their interest in the suggestion, have considerably exceeded my expectations, there are still extensive areas in which no observer is assisting us. I will be glad, therefore, to hear from any one who will aid in the work, and will send a supply of forms to any address. May I ask also that those interested will mention the matter to their correspondents, as many who do not read the "British Naturalist," might be willing to help.

In filling up the forms, one should be used for each night, and absolute or partial failure should be chronicled with as much care as the greatest success. It will be well, also, under "Other observations," to note what species come to *Silene* or other flowers, what are noticed at rest on palings and tree trunks, and any other item showing what species are on the wing. As a sample of how the forms should be filled, I quote form received from Mr. Home, of Aberdeen.

May 5. Wood near Aberdeen; Wind, S.S.E., moderate; Sky, obscured; Atmosphere, dry; I got six *Menyanthidis* at rest on the palings before I sugared, but not a single moth appeared on the sweets.

May 9. Moor near Aberdeen; Wind, S.S.E., very light; Sky, clear; Atmosphere, dry; I again found six *Menyanthidis* and one *Glanca* at rest in the palings before sugaring, but nothing turned up at the sweets. I saw several *Noctuæ* flying and netted one *Gothica*.

May 10. Moor near Aberdeen; Wind, S.W., moderate; Sky, obscured; dry, warm night; I took two *Menyanthidis* at rest, and after dark one pair in cop. Nothing at all at sugar. A friend sugared in a fir wood on the edge of the Moor. He netted one *Menyanthidis* and one *Thallasina*, but got nothing at sugar.

May 11. Coast at Bay of Nigg, Kincardineshire; Wind, W., light; Sky, obscured; Atmosphere, close, night warm and offering to rain; I netted five *Ochreous* vars. of *Conspersa* and saw many more, but they were difficult to catch on account of the *Silene* flowers not being properly in bloom; all were taken before 9 p.m., only one *Gothica* came to sugar.

These are quoted only for the manner of filling up, I do not propose to generalize on insufficient data. As a sample of successful and unsuccessful sugaring I quote two forms from Mr. Mosley, of Huddersfield.

"March 28. Copse on Roadside; Wind, S.E., slight; Sky, partly obscured, moon bright before looking at sugar; Atmosphere, dry; Sugared about 30 trees, not before sugared, looked over once. Result: *Gothica, 1; Depressaria applanna, 3.*

April 3. Sherwood Forest; Wind, N.W., very little; Sky, clear, but moon not risen; very dry; Trees, oak principally, sugar laid on before dark, looked over once. Results: *C. vaccinii*, about 40; *S. satellitia*, about 20; *T. munda*, 1; *Helops striatus*, 12."

Dr. Chapman writing on the subject gave his ideas as follows:—"I am sorry to say I do not sugar now, but my recent experience at sallows throws some light on part of the question. Sallows opened early in March—nights fairly good (as per tradition) were more or less cloudy and not cold, and moths were fairly common (20 to 50 to a tree). Then came a change of weather, fine and clear, no cloud day or night. As this came on the results were bad. But though the weather continued clear, the days got warmer and the evenings remained warm up to a certain point, and, as it happened, later each evening, so that the season ended 8 p.m. on 22nd, 8-45 on 24th, the last night. The moon shining brightly had no effect, and the cooling by radiation taking place slowly. In other seasons, with colder days and mornings, a bit of blue sky, the size of a pocket handkerchief produced cooling enough to make an evening blank after the first tree or so."

I trust these extracts will assist those who were doubtful what to record, but do not be solely guided by these, from which, it may happen, the most important points may be excluded. Record anything or everything bearing on the question, and if we do not succeed in our quest, the fault will not be yours.

General Notes.

MOISTURE AND MELANISM.—Mr. Tutt has published in the "Record," a very characteristic reply to my article on this subject. He has been, no doubt, well advised, to print it where the original article had *not* appeared. A rejoinder to the augumentative portion will be prepared in due time.—JOHN E. ROBSON, Hartlepool.

NOTES FROM THE LONDON DISTRICT, EASTER, 1893.—The Easter holidays of 1893 will be long remembered for the lovely weather that prevailed during the whole time. I made several excursions to localities around London, in company with other members of the North London Natural History Society, and a few notes may be of interest.

On Good Friday, 31st March, we took train to Loughton, and soon reached Epping Forest. Working up the "green ride" through Monk's Wood, a few hybernated butterflies were seen, including *Vanessa io*, *V. polychloros*, and *V. urticæ*, while tree trunks produced one or two *Xylocampa lithoriza.* Reaching the birches north of Jack's Hill, some of our party were soon busy with *Brephos parthenias*, but, as this species had been out in the forest since 11th March, their condition was not very good; *Cymatophora flavicornis*, usually occurring on the same ground, appeared to be quite over. The only other insect of note was a female of *Tæniocampa populeti*, found in a pool beneath a sallow bush, she has since laid a nice batch of eggs.

Saturday, 1st April, we went to Ongar Park Wood. This is close to North Weald Station, being three miles from Ongar. The banks on the roadside were quite gay with the flowers of the dog violet, and we noticed a fair sized clump of the white variety of the scented violet (*Viola odorata* var. *alba).* Hybernated specimens of *Gonepteryx rhamni* and some of the Vanessidæ, and several newly emerged *Pieris rapæ* represented the butterflies. Arrived at the wood, we kept a look out for *Brephos notha*, but the few specimens of *Brephos* taken were all *parthenias.* In the afternoon we came back to Theydon, and worked the sallows there, taking the usual Tæniocampidæ, including *T. munda* and *T. gracilis*, and a few *Larentia multistrigaria*, *Selenia illunaria*, &c.

Monday, 3rd April, went to Weybridge, and worked the pines at St. George's Hills. Outside the station, a house-martin made one think that summer was really coming. Our exertions among the pines for *Trachea piniperda* met with but little success, two specimens only being taken, but a fair number of larvæ, chiefly *Thera variata* and *Ellopia fasciaria* were beaten from the boughs. *Vanessa polychloros*, *Gonepteryx rhamni*, and *Brephos parthenias* again turned up, while a single female of *Pachycnemia hippocastanaria* fell to my share.

Tuesday, 4th April. West Wickham Wood. Here we met with the usual lot of collectors in this locality, being turned off by the keeper just as we had found the best ground. However, our captures included some fine *Tephrosia crepuscularia* (chiefly on pine trunks) two *Lobophora lobulata* and one *Trachea piniperda.* The famous "Bishops fence" only produced one *Xylocampa lithoriza*, and fences were generally a failure, owing chiefly to the direction of the wind.—A. U. Battley, 28, Amhurst Park, N.

Post Card Notes. THE EARLY SEASON.—I have received a large number of communications on this subject, all arriving at the conclusion, that Lepidoptera generally are appearing from three weeks to a month before their usual time. There is so much repetition of species in them, that I have made a selection of two or three from distant localities. I have, however, no report from any Coleopterist, or collector of any other order. It would be interesting to record if other orders are similarly affected by the fine weather. We might naturally presume they are, but it would be well to know, as it is often the unexpected that happens.—ED. B.N.

THE EARLY SEASON IN ABERDEENSHIRE.—Things are not so plentiful here in the early months as in more Southern localities, but up to the present time I have seen or taken *multistrigaria*, *suffumata*, and v. *piceata*, *badiata*, *derivata*, *gothica* and v. *gothicina*, *rubricosa*, *stabilis*, *instabilis*, *lobulata*, *lunaria*, *illunaria*, *miata*, *psitticata*, *ferrugata*, *bidentata*, *cratægata*, *carpini*, *menyanthidis*, *atomaria*, *piniaria* and many pugs and micros.—A. D. CONNON, Pitcaple.

THE EARLY SEASON IN DURHAM.—The earlier part of the season was spoiled here by a long continuance of cold east winds. Sallows opened very irregularly, some being quite over in March, while others were flowering in May. I visited them several times in the early part of April, but absolutely without success. The very cold wind apparently preventing the Tæniocamps visiting the flowers. Campion was well out in sheltered places in the middle of May, quite a fortnight early. I have taken at it, and in the woods, over 20 species for whose appearance I have no previous record earlier than June. The best of these at Campion being: May 19th, *Dianthœcia capsincola*, *cucubali*, *carpophaga*, *H. adusta;* 22nd, *H. dentina*, *thallasina;* 24th, *N. elymi*, and on 20th May, *P. carbonariella*, of which I have no previous record before July. In Hezleden Dene, 12th May, *T. crepuscularia* (only once before taken in May) *C. silaceata*, *Tortrix ministrana*, and a week later *C. corylata*, one of which is a beautiful form, the darkest I have met with, *E. affinitata*, *A. candidata*, and many other common things equally early. It is to be observed that this part of the country is always very late, and there is seldom much to get before June.—JOHN E. ROBSON, Hartlepool.

THE EARLY SEASON, DORSET.—What an early season. Oaks and other trees are in full leaf. Marsh Valerian, Hawthorn, and other flowers out. Oriental plane coming out—in 1879 it did not come out till August. Insects equally early. March 27th, *P. rapæ* in fair numbers, April 4, *Eubolia lineolata*; 6, *A. cardamines*; 21, *A. euphrosyne*, *S. alveolus*, *E. indigata*, *Eupœcillia maculana*; 22, *E. edusa*, both sexes, *P. icarus*, *agestis*, *C. phlœas*, *T. tages*, *S. megæra*, *S. pamphilus*, *H. brunnichiana*, *Bibio* *mario*, *Tipula vernalis*; 24, *C. silaceata*, *A. remutata*, *C. pusaria*, *P. petraria*, *H. arbuti*, *L. marginata*, *P. purpuralis*, *P. cespitalis*, *Libellula depressa*, &c. In fact most things are generally out we expect generally to see 1st June.—C. W. Dale, Glanvilles Wootton, 24th April, 1893.

The Early Season in Somerset.—Nearly all Lepidoptera are a month earlier than usual. *Alveolus* appeared 14th April; *tages* and *euphrosyne*, 20th; *icarus*, 28th; *lubricibeda*, 3rd May; *menthastri*, 5th; *jacobœa*, 6th; *sylvanus*, 11th; *mendica*, 20th; and so on to any extent. —W. Macmillan, Castle Cary.

The Early Season in Devon.—We have had the most marvellous April I ever remember, and up to the 15th of May when the weather changed and much needed rain fell, the season has been three to six weeks in advance. Fancy *villica*, *artemis*, *athalia*, and *selene* all on April 27th. I actually took 33 species of Heterocera (without counting small Geometræ) at light in one week May 9th to 15th. I never did such a thing before.—(Miss) K. M. Hinchliffe, Instow.

Query, Locusts.—Can any reader of the "British Naturalist" inform me if he knows of the occurrence of any species of Migratory Locust in the British Isles within the last ten years, if so, will he oblige me with particulars of same?—W. Harcourt Bath, 195, Ladywood Road, Birmingham.

Query, Lycæna argiolus.—Does the Holly Blue continue to exist in its old haunts, or is it disappearing from many of them, and if so, can any one suggest a cause for the disappearance?—W. Macmillan, Castle Cary.

Publications Received.

Lepidoptera of Dorsetshire by C. W. Dale.—It is not often that a local catalogue reaches a second edition. Generally, such publications are out of print a long time before there appears to be demand for another, and often by then the original author is dead, and an altogether new work is projected. But in the six years that have elapsed since the first edition of this excellent catalogue appeared, no less than 130 new species have been added to the county fauna. This speaks volumes for the activity of the Lepidopterists of Dorsetshire, and we do not wonder Mr. Dale has issued a second edition of his carefully compiled catalogue, which will be found, not only to include the 130 species new to the county, but a variety of additional records of the occurrence of the rarer species. He has omitted the "other orders" which formed an interesting addition to the first edition.

THE OCCASIONAL PHENOMENAL ABUNDANCE OF CERTAIN FORMS OF INSECT LIFE, BY W. E. SHARP.—This reprint from the Transactions of the Liverpool Biological Society, deals principally with the occasional abundance of *Deilephila galii.* Our esteemed contributor attempts to connect the occasional abundance of this species, with dry weather and low average temperature. We think the immigration theory is now very generally accepted, and that it will be difficult to displace it with another, but Mr. Sharp argues, as he always does, with considerable force, and marshalls his facts in a very striking manner. The pamphlet is an interesting addition to the controversy which appeared in our own pages, and though he has not convinced us, we must say he makes out a very good case.

RECREATION, BY WILLIAM ODELL, F.R.C.S. ENG.—A valuable argument in favour of athletics for those who have much brain work in early life. The author shows that while the leaders of the scientific world are men of splendid physique, those who have been noted at school or college for their athletic performances often rise to great eminence. As an illustration he tells us that " in the very first boat race between the Universities, three men who afterwards became bishops rowed in one of the boat, and another rowed in the other." Whilst we agree with all the author says, and cordially recommend the book to those interested in the training of youth, we are of opinion that Natural History offers a fine field for those who have no taste for Athletics, and we do not think those who have given attention to such pursuits, have suffered at all in competition with their fellows.

THE GENUS SILPHA, Linné.*

BY REV. W. F. JOHNSON, M.A., F.E.S., AND G. A. LEWCOCK.

The members of this genus form one of the great sub-divisions of the tribe Silphina and belong to the sub-order Clavicornia. They differ from the genus *Necrophorus* in having eleven joints in their antennæ, whereas the former possess but ten. This difference, however, is more apparent than real, as a close examination of the *Necrophorus* antennæ reveals an almost imperceptible second joint—it is perhaps more distinct in specimens of *N. humator* and *N. vespillo* than in other members of the genus, although it varies considerably in these species. Apart from this distinction, however, the antennæ gradually thicken towards the apex, but in *Necrophorus* they terminate with a strong four-jointed club. Then, again, in *Silpha* the head is extended into a long narrow neck, which is drawn up under the thorax when at rest.

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* *Read at Meeting of City of London Entomological and Natural History Society, May 16, 1893.*

The life-history of many of the species is well-known, the majority being carrion-feeders, but more investigation is needed with respect to others. The methods adopted by the *Necrophori* in burying their food have been so frequently dealt with that it is needless to attempt recapitulation. There is no doubt that in the first place the female beetle deposits eggs in the pabulum, but that the young larva is entirely reared on that food is very questionable, as anyone who has had experience of working this group must know. On a certain occasion one of us discovered a dead duck, and besides finding on it a hundred or more Histers, any quantity of *Choleva chrysomeloides* and other Cholevina, several Staphylinidæ, &c., there were eight *Silpha thoracica*, three or four *Necrophorus mortuorum*, some twenty *N. humator*, and no end of dipterous larvæ. With such ravenous devourers as these, what chance would a beetle larva have to attain the full-fed stage, unless, like *Rhipiphorus*, it matured in 48 hours; it is quite certain that it must make use of its legs, and move off in search of other food. This food must also vary: sometimes it may be decaying fungus, a caterpillar, snail, or decomposing vegetable matter. In the case of *S. opaca* the larva is said to attack beet, mangold-wurzel, and other root crops. Of this we have had no experience, although we have searched diligently for it in agricultural districts. The change to pupa takes place, as one might naturally expect, beneath the soil, and the beetle emerges in three or four weeks.

The number of British species contained in Sharp's 1871 Catalogue amounted to thirteen, and one var., *Subrotundata*. Fowler (1883) reduces this number to twelve, placing *littoralis* in a separate genus—*Necrodes*. Sharp's 1883 Catalogue still retains the original number. In the "Coleoptera of the British Isles" Canon Fowler clearly sets forth a reason for separating *littoralis* from the other members of the genus, the thorax of the latter being sub-orbicular in shape, and in the remainder of the species more or less semicircular. Moreover, the posterior legs of the male *littoralis* are much longer, the femora strongly thickened, and the tibiæ decidedly rounded or curved, while it is not so with other members of the group. The twelve species in the genus proper might, with advantage, be placed in sub-genera in a manner similar to Dr. Chapman's tabulation of the genus *Acronycta*, although it can hardly be done on the same lines. Without a thorough knowledge of the whole group it is impossible to attempt this, therefore we must confine our observations to the divisions as suggested by Canon Fowler. In his work the species are tabulated in two groups. The first has the thorax truncate or emarginate in front, and includes ten species, viz.: *tristis*, *nigrita*, *obscura*, *quadri-punctata*, *reticulata*, *opaca*, *thoracica*, *rugosa*, *sinuata*, and *dispar*. In the second group the thorax is semicircular; the two species included being *lævigata* and *atrata*. The first group is sub-divided into five other divisions. The second group is also divided. So that we have seven sub-divisions of the whole genus, which will be dealt with seriatim. Discarding *Necrodes littoralis*, our first species are—1. *Silpha tristis*, Ill., *S. nigrita*, Creutz., and *S. obscura*, Z. In these species the second joint of the antennæ is nearly as long as the third. In *S. nigrita*, however, the antennæ are comparatively shorter and more bead-like than that of *S. tristis* and *S. obscura*.

In placing *S. nigrita* second in this division, Canon Fowler has departed from the order laid down in both of Sharp's Catalogues and that of his own of 1883. It is difficult to understand the reason for this alteration. Some stress is placed on the fact that *S. tristis* has three very distinct raised keels on each elytron, while in *S. nigrita* and *S. obscura* the keels, although present, are not so distinct. But then *S. tristis* and *S. obscura* agree both in shape of antennæ and in each having the interstices of the elytra evenly punctured; whereas in *S. nigrita* the punctures are decidedly coarser, very uneven, and in some cases confluent.

1. *S. tristis.*—Oblong, and rather shiny. Occurs at several localities in Kent, and may frequently be found running by tides and pathways. Several specimens, principally from Deal, have been exhibited at City of London Society. Mr. Newbery obtained the species from Merton; the late Mr. Hall took it at Dover; Mr. A. J. Chitty, one from sea coast, North Wales, and one from Luccombe Chine, Isle of Wight; Dr. Ellis records it as taken by F. Archer at Crossby in May, 1862. It occurs also in the North of England, but rarely in Scotland. Not recorded from Ireland.

S. nigrita.—More shining than preceding species, and with interstices of the elytra unevenly punctured. More common in North of England and Scotland. Mr. W. Chaney records it as taken on Ben Nevis two or three years ago by one of his sons; Mr. A. J. Chitty, two specimens from Folkestone, in April, taken on hot paths in sunshine on or about the Lees. No Irish records.

S. obscura.—Very like *S. tristis*, from which it differs in being duller in appearance and in the smoother elytra. The thorax is broader than that of *S. nigrita*, and the interstices are evenly punctured. It is said to be common in the London district, but there are no recent records of its capture there. Found commonly in many parts of Kent, in carcases, at roots of grass, &c., often on pathways (G. C. Champion, Kent and Surrey Coleoptera). Frequently seen very busy in some numbers, feeding on remains of snails that have been crushed by passers-by on previous night, on Darland Hill, Chatham. Also from Deal, exhibited at City of London Society. Recorded from Folkestone by Mr. A. J. Chitty. Ireland—Belfast district, taken by the Rev. J. Bristow and the late Dr. Templeton; one specimen having been presented to Mr. Johnson.

2. The single representative of this division is *S. quadripunctata*, L. This species has the four terminal joints of the antennæ produced and resembling a club. It is unlike the other members of the genus in colour of elytra, which is testaceous, and has four round black spots, that is two at the base and two slightly behind the middle. The beetle is found on trees, its food being chiefly lepidopterous larvæ, and it appears to be especially partial to those of *C. brumata*. The beetle occurs at Loughton on oaks and hornbeam, and has frequently been exhibited at the City of London Society by various entomologists. Specimens have also been brought from Brockenhurst and other parts of the New Forest. The Rev. A. E. Hodson used to take numbers in the Forest of Dean. Mr. G. C. Champion (Kent and Surrey Coleoptera) records it as not uncommon on oaks at Coombe Wood, Darenth Wood, &c. Several Midland localities are specified by Canon Fowler, but the beetle appears to be rarer further north and in Scotland. Ireland: The Dargle, county Wicklow (McNab's Dublin List, 1878).

3. *S. reticulata*, F., represents this division in Britain, but it must be an exceedingly rare species, as Mr. Champion's is the only reliable record we have to hand; the locality given by him is Battersea fields, a place which, for entomological purpose, has practically ceased to exist. Mr. A. J. Chitty writes that he has "a specimen from F. Smith's collection, without locality." The antennæ of this beetle have the second joint twice as long as third, the seventh joint slightly narrower than eighth, and terminate in a gradual club. The interstices of the elytra are coarsely punctured, without tubercle behind middle.

4. *S. opaca*, L., differs from the preceding in having the second joint of the antennæ only slightly longer than third, the seventh joint is not nearly so stout as eighth, ninth, tenth, and eleventh, which together form a strong club. The interstices of the elytra are finely punctured, with a strong tubercle at end of third keel behind the middle. The beetle is local and uncommon in England; found mostly in carcases, moss, &c., Sheerness, Deal, Whitstable, Coombe Wood, Woking, &c. (G. C. Champion, Kent and Surrey Coleoptera); it is rather common in Scotland, but abundant in the Orkney. Mr. A. J. Chitty captured a specimen struggling on the sandhills in a very high wind on Woolacombe Sands, North Devon, in May. Ireland:—Recorded from Portmarnock, county Dublin, by McNabb, and near Belfast, by Haliday. A specimen sent me last year was picked up at Lough Swilly, in Donegal (W.F.J.).

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TO CORRESPONDENTS.

Owing to an accident a portrait is not ready for the present month. With the July part a portrait of J. Jenner Weir, Esq., F.L.S., F.Z.S., will be given.

A considerable number of communications are unavoidably held over for want of space.

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5. Four British species are included in this division, viz.: *S. thoracica*, *S. rugosa*, *S. sinuata*, and *S. dispar*. The whole of these species have the second joint of the antennæ shorter than the third, but this difference is scarcely apparent in *S. thoracica*, which, from its broad stucture and red thorax, might well form a sub-genus of itself.

S. thoracica, L., can scarcely be confounded with any other British species, as besides having a red thorax, the elytra is much depressed and the ridges wrinkled, and, viewed at rest, has the appearance of having been trodden on and crushed. The beetle is generally distributed, but is commoner in fir plantations than elsewhere. Sometimes taken on the wing in hot sunshine, Oxshott and Farnham, Surrey; the larvæ also can be taken at decaying fungus in same localities (G.A.L.). Taken by Mr. Chaney at Esher, in putrid fungus. Mr. A. J. Chitty finds it "usually in small numbers, but occurs at times plentifully, as once in 1888 in New Forest under a dead pony; also from Craigillachis Bansphin under a small dead bird; Oxshott, South Wales, and other localities." Not recorded from Ireland.

S. rugosa, L., and two following, are of dull black, or brownish colour. In the species under notice the elytra have in the interstices a number of elevations or small tubercles arranged irregularly. The beetle is generally the commonest of the genus, and occurs at every part of the British Isles, and may be taken at any carrion. Ireland: Very common all over the country; in fact, I find it in every piece of carrion (W.F.J.).

S. sinuata, F. Somewhat resembles the preceding, but the interstices of the elytra are without the small tubercles, and the ridges are carried to margin of elytra, the central interstices being prolonged at apex. The beetle is very common at Rainham, Essex, and in 1888 could be taken in hundreds at this locality; also occurs at Loughton, Epping, &c., Essex; Oxshott, and other places in Surrey. "Not uncommon in carcases, Chatham, Deal, Sheerness, Mickleham, &c." (G. C. Champion, Kent and Surrey Coleoptera.) Common on sandhills in Liverpool district (Dr. Ellis). Common at Hartlepool (J. E. Robson). Ireland: Taken near Belfast by Haliday and Templeton. I have taken it on shores of Lough Neagh, but never in numbers; also under rejectamenta on lake shores (W.F.J.).

S. dispar, Herbst. Closely resembles the preceding, from which it is distinguished by having the scutellum entirely covered with thick pubescence, and the elytra also is plainly pubescent. The beetle is certainly rare in South of England as well as in the north; indeed we have no authenticated record for the south. Several localities are given by Canon Fowler, but it also appears rare in these. Ireland: I have a specimen taken here, but it is always to be had, though very sparingly, on the shores of Lough Neagh. I got several at Derryadd

Bay on the shore, among rejectamenta mixed with fish scales, evidently where fishermen had been landing fish (W.F.J.).

6. *S. lævigata*, F. A very distinct species, having smooth elytra, stout legs, and very short antennæ. Mostly found in chalky districts. Several have been exhibited at the Society's meetings by various members, who have obtained them from Kent and Sussex districts. Taken at Higham from a ditch by Mr. Cripps; four or five crawling on pathways at Deal by Mr. Allbuary; and also by Mr. Jarvis. Recorded by Mr. Champion (Kent and Surrey Coleoptera) as not uncommon in carcases, at roots of grass, &c., often on pathways, Chatham, Dover, Herne Bay, Ramsgate, Sheerness, Lewisham, Box-hill, and Gomshall. Also noticed pretty commonly on Darland Hill, Chatham, by Mr. W. C. Chaney. Found very common on south-east coast of Kent by Mr. A. J. Chitty, running over hot paths (April); likewise at Deal and south-west Hampshire. Mr. Chitty does not remember taking it at carrion, but has found it at roots of trees in the New Forest. Several additional localities are given by Canon Fowler, and Mr. Robson has taken it at Hartlepool. Not recorded from either Scotland or Ireland.

NATURALISTS OF THE DAY.

XVII.—JOHN JENNER WEIR, F.L.S., F.Z.S., F.E.S.*

I was born at Lewes on 9th August, 1822. My father was John Weir, late of the Legacy Duty Department, Somerset House.

From the earliest dawn of memory I can think of myself as being ardently fond of Natural History, indeed the love of nature has been all my life a passion with me. I have always felt pleasure in the reflection that Dr. Gideon Marstell, F.R.S., the eminent naturalist and palæontologist, attended at my birth.

When my brother Harrison Weir, who is nearly two years younger than myself, became old enough to join in my pursuits, we kept a multitude of living creatures, and have certainly had not less than one hundred different species of vertebrates in captivity.

I first made a collection of the eggs of British birds, and afterwards of dried botanical specimens, but although occasionally I collected insects, it was not till the summer of 1843 that I seriously took up the study of Entomology, and I find my first note on that subject was made 1st March, 1844.

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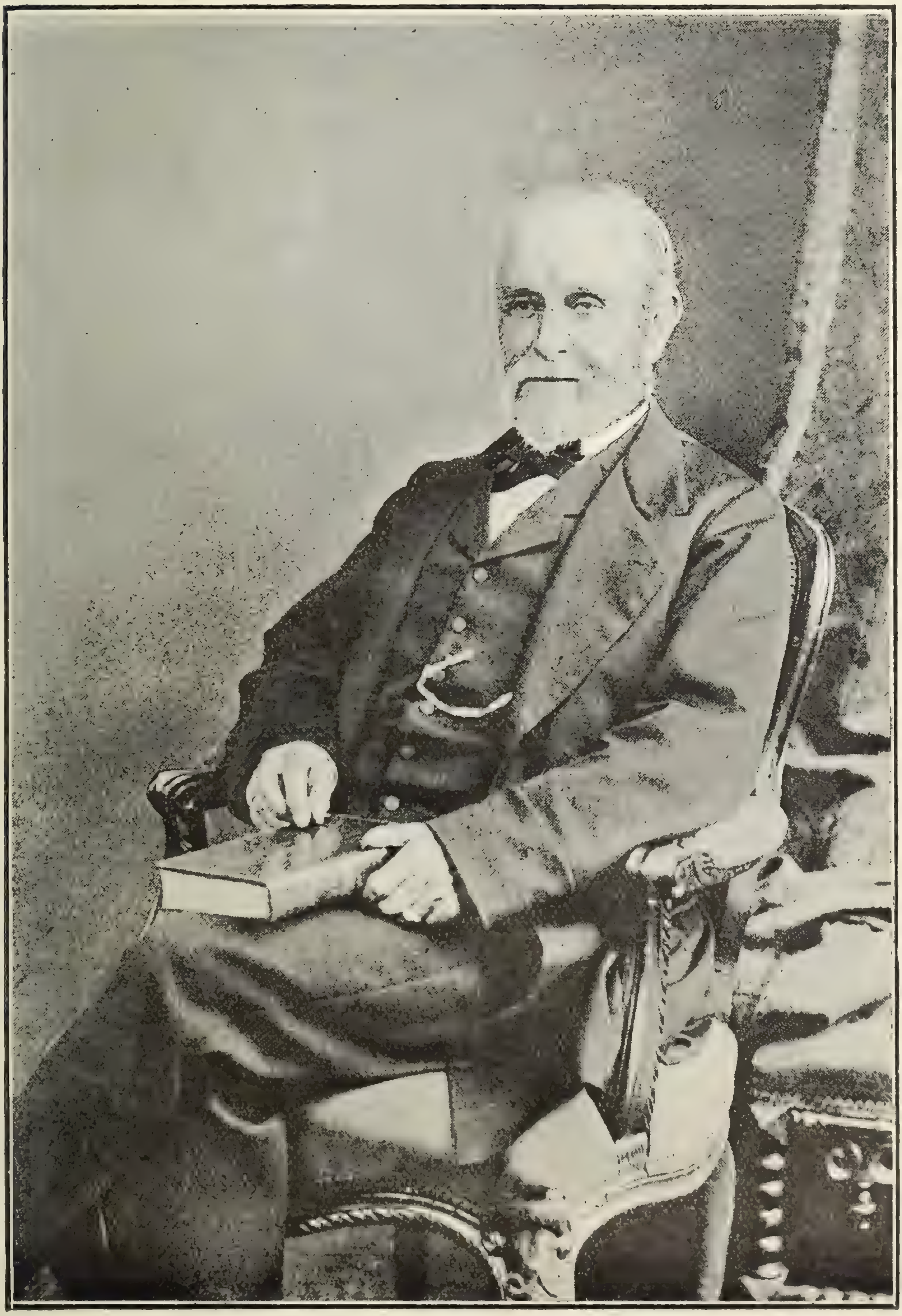
* *This was sent in letter form to enable me to draw up a brief biography of Mr. Weir, but the whole is so interesting that I have no hesitation in giving it in his own words.—Ed. B.N.*



JOHN JENNER WEIR,
F.L.S., F.Z.S., F.E.S.

BRITISH MUSEUM
NATURAL HISTORY

At that time, I resided at Camberwell, within an easy walk of Dulwich Wood of 80 acres, to which access was to be had without difficulty; London, in those days, broke off abruptly, and at four miles from London Bridge, one was as much in the country as if fifty miles distant; there were rookeries at the Tower, in St. Dunstans Churchyard, and one nest in Wood Street, Cheapside. Swallows had their nests in the Custom House, and I have often seen Falcons on the spire of St. Dunstan's Chuch, one Peregrin Falcon took up its residence in the spire of Shoreditch Church and committed sad havoc among the pigeons in Spital Fields, and it was no unusual thing for my own pigeons at Camberwell, to be suddenly swooped upon by a Falcon.

My first communication on Entomology was to the "Zoologist," dated 14th June, 1845, on the capture of *Ino (Procris) globulariæ*, *Agrotis cinerea*, and *Crambus pygmæus* at Lewes; the first mentioned species had been reputed British, but, until I obtained it at Lewes, it had not been proved beyond all doubt to be so.

From that date to the present time I have occasionally sent contributions to the "Zoologist," and more often to the "Entomologist," since 1864, when that magazine, after 22 years incorporation with the "Zoologist," was again divided from it.

In 1844 I became friendly with Mr. George Bedell and Mr. Douglas, and soon afterwards with the late Mr. H. T. Stainton, whose recent death we are all so much lamenting, these friendships turned my attention towards the study of the Micro-lepidoptera in which we were all at that time deeply interested, and I was able to discover many species new to the British fauna.

Late in 1844 I first attended a meeting of the Entomological Society and was elected a member in January, 1845; this led to my acquaintance with most of the Entomologists of the day, including William Spence, James Frances Stephens, Edward Doubleday, George Newport, Edward Newman, I. O. Westwood, and others, from all these I received the greatest kindness and their assistance is remembered by me with gratitude.

For many years I worked most assiduously at the Micro-lepidoptera, but in 1870 I had a sad accident, which resulted in the loss of the top of my left thumb, this quite incapacitated me for the delicate manipulation necessary for the setting of those minute insects.

At the suggestion of Dr. A. R. Wallace, I undertook, in 1868, a series of experiments on the relation between insects and insectivorous birds, and especially on the relation between the colour and edibility of Lepidoptera and their larvæ, my conclusions, on this subject, were embodied in a paper read before the Entomological Society, 1st March, 1869, published in the Transactions of that year, and a further paper read 4th July, 1870, and also published in the Transactions. Before the publication of these experiments this subject had been dealt with only hypothetically.

I have been twice Vice-President of the Entomological Society and for seven years Treasurer, and have been a member of the Council occasionally since 1849.

Although I have written but little for publication, I have for many years carried on an extensive correspondence with eminent Naturalists, more particularly with the late Mr. Darwin, whose numerous letters to me I treasure as of priceless value, although since his death I have never been able to muster up courage to look at them; during that great man's life I thought of him daily and all observations or experiments I made were in their results communicated to him.

Owing to a weak heart, I can no longer take the exercise necessary for a field naturalist, and for many years past have been much confined to my study, where, in the midst of my collection, I lead a very happy life.

Mimicry is to me now the most fascinating study, and I have made a large collection of the Danaine Rhopalocera and the other families of butterflies which mimic them.

Speaking as a septuagenarian, I may say that the life of a Naturalist is a very happy one, as long as he is able, he is engaged in the most healthy out-door exercise, and when, through failing powers, he can no longer take his pleasure to the same extent in the fields, woods, mountains, and marshes, he can enjoy his collections, and his library to a geater extent than those, who have never cultivated the habit of enjoyment, have the least idea of.

My official life may be condensed in a very few words:

I entered the Customs Service in the clerical division on the 6th November, 1839, and, by promotion from time to time, became Assistant, and afterwards The Accountant and Controller General, the former of which offices I held for seven and the latter for ten years.

I retired, after rather more than forty five years service, April 1885.

MALACOLOGICAL SOCIETY OF LONDON.

May 12th, 1893.—The Malacological Society of London read the following papers at this meeting, Dr. H. Woodward, F.R.S., V.P.G.S., President, being in the chair: "On the Anatomy of Paryphanta," Lt.-Col. Godwin-Austin: "New Land Shells from Annam," E. A. Smith: "On the Genus Carinaria," G. B. Sowerby: "Note on two species of Bulimulus," S. J. DaCosta.

June 9th, 1893.—The third meeting was held at 67, Chancery Lane, W.C. The following were elected members:—Dr. Fischer, Colonel Parry, and Messrs. Dantzenberg and Squyer. The following papers were read: "On *Nautilus*, Recent and Fossil," G. F. Harris, F.G.S.; "On the distribution of *Geomalacus* in Ireland," R. F. Scharff, D.Sc.: "On the habitat of the Genus *Ephippodonta*," E. H. Matthews: "On the Occurrence of *Cyclostrema millepunctatnm* Friele in the British Seas," G. W. Chaster.—E. R. Sykes, *Hon. Secretary*.

THE MOLLUSCA OF NOTTINGHAMSHIRE.

BY W. A. GAIN.

(Continued from page 48.)

Order PULMONOBRANCHIATA.

Family LIMNAEIDÆ.

GENUS SEGMENTINA, Fleming.

Segmentina nitida, Müll. (=*Planorbis lineatus*, Walker.)—Taken in the lake at Highfield House by Mr. Lowe. Dodd and Musson. Of rare occurrence at Beeston (Musson).

GENUS PLANORBIS, Guettard.

Planorbis fontanus, Lightfoot (=*Pl. nitidus*, Jeff.)—Occurs in several ponds, principally in the neighbourhood of Nottingham, usually in small numbers, in two instances only Mr. Musson records it as plentiful. Also in the Lenton canal. I have taken this species pretty freely in the lake at Clumber, and have found it in the rejectamenta of the river Trent.

Planorbis nautileus, L.—Widely distributed, and often found in large numbers.

Var. *crista*, L.—Near Worksop (Musson).

A var., probably *crista*, is also mentioned in the catalogue of Dodd and Musson as occurring at Bulwell.

Planorbis albus, L.—Common, and widely distributed.

Planorbis parvus, Say. (=*Pl. glaber*, Jeff.)—Lake at Thorsby, and one specimen from the lake at Clumber (Musson).

Planorbis rotundatus, Poiret. (=*Pl. spirorbis*, Jeff.)—Abundant, and widely distributed.

Planorbis vortex, L.—Plentiful in ponds, &c., throughout the county.

Var. *compressa*, Mich.—Stanton-on-the-Wolds (Lowe).

Planorbis carinatus, Müll.—Common, and widely distributed.

Var. *disciformis*, Jeff.—I have taken this variety in the canal at Newark.

Planorbis umbilicatus, Müll. (=*Pl. complanatus*, Jeff.)—Common throughout the county.

Var. *rhombea*, Turt.—Bawtry. Ditch in Lenton meadows (Musson).

Planorbis corneus, L.—Common, and widely distributed.

Planorbis contortus, L.—Widely distributed.

Sub-family PHYSINÆ.

GENUS BULLINUS, Adamson.

Bullinus hypnorum, L.—Common throughout the county.

GENUS PHYSA, Drap.

Physa fontinalis, L.—Common in ditches, &c., throughout the county.

Var. *inflata*, Moq.—Wollerton.

Var. *oblonga*, Jeff.—Lowe describes a var. *acuta* which may probably be referred to this form. It was found near Lenton.

Sub-family LIMNÆINÆ.

GENUS AMPHIPEPLEA, Nillson.

Amphipeplea glutinosa, Müll.—"A still sheet of water near the Trent, above the Beeston Ryelands, where it is occasionally plentiful, twenty or thirty specimens having been taken on one day, yet it is frequently difficult to discover a single specimen in a whole morning's search" (Lowe).

GENUS LIMNÆA, Bruguiere.

Limnæa peregra, Müll.—Plentiful everywhere. The following list of varieties is doubtless far from complete.

Var. *ovata*, Drap.—In the Musco-sic Brook, near Beeston (Lowe). Worksop (Musson). Elksley.

Var. *acuminata*, Jeff.—Worksop (Musson). Elksley.

Var. *intermedia*, Fer.—Worksop (Musson). Fledbro', East Drayton.

Var. *oblonga*, Jeff.—Lenton (Musson).

Var. *minor*, Colb.—Wollaton.

Var. *labiosa*, Jeff.—Rufford (Musson). Marnham.

Mons. decollatum, Jeff.—Wollaton, &c. (Musson).

Limnæa auricularia, L.—Occurs in several places, but is nowhere plentiful.

Var. *acuta*, Jeff.—Lake at Highfield House (Lowe).

Limnæa stagnalis, L.—More or less plentiful in several localities, especially in the neighbourhood of Nottingham.

Var. *fragilis*, L.—Stanton-on-the-Wolds (Lowe). Canal at Worksop, Lenton canal, Bawtry (Musson). In a ditch at Marnham this variety occurred some years ago in profusion, a few only of the type form being seen.

Limnæa palustris, Müll.—Plentiful in many places.

Var. *corva*, Gmel.—Sawley (Lowe).

Var. *tincta*, Jeff.—"This variety has been found sparingly at Beeston and Lenton" (Lowe).

Var. *lacunosa*, Zgl.—Nottingham meadows.

Mons. decollatum, Jeff.—Nottingham meadows (Musson).

Limnæa truncatula, Müll.—Plentiful, and widely distributed, vast numbers may sometimes be seen on the canal banks near Nottingham.

Var. *major*, Moq.—Pond near Darlton.

Var. *minor*, Moq.—Lowe says the var. *minutus* "is the general form of *Limnæus truncatulus* found in this neighbourhood."

Limnæa glabra, Müll.—"One specimen has been found in this neighbourhood; it was dredged in the river Leen, at Bulwell, a very singular locality" (Lowe). I know of no other record of the occurrence of this species in the county.

Sub-family ANCYLINÆ.

GENUS ANCYLUS, Geoff.

Ancylus fluviatilis, Müll.—Occurs in most streams having a stony bottom.

Var. *capuloides*, Jan.—Tottle Brook (Lowe).

Var. *albida*, Jeff.—Bulwell Forest, in a stream of extremely pure water coming from a spring (Musson).

GENUS VELLETIA, Gray.

Velletia lacustris, L.—Generally distributed, but not abundant, and usually of small size.

MR. DALE ON NOMENCLATURE.

("British Naturalist," March, 1893, pp. 50–53.)

BY DR. BUCKELL.

Mr. Dale's paper is chiefly marked by two characteristics; profound animosity to the works of Staudinger and Kirby, and great carelessness in verifying alleged facts.

Mr. Dale starts with the statement that the most important of the rules adopted by the British Association in 1842 was "that the 12th edition of the "Systema Naturæ" of Linnæus should be adopted as the starting point." No such rule was adopted by the British Association. The rule which was adopted was that the law of priority should not extend to authors older than Linnæus. It is true that the 12th edition is mentioned in the argument of the Committee, but there is nothing to show that the rival claims of the two editions (10th and 12th) were considered by the Committee at all.

Mr. Dale next says that the law of priority "must be read in conjunction with the rule fixing the starting point at the 12th edition of the 'Systema Naturæ.'" As there is no such rule, Mr. Dale's "must" becomes inoperative.

With regard to Mr. Dale's remarks on "nonsense and barbarous names," for at least one illustration of which he is indebted to the despised Staudinger, the only thing that need be said, is that the barbarity of *Argus*, *Bellargus*, and *Semiargus*, is not self-evident; but of course this is a question of taste.

Mr. Dale then asserts that "another rule followed by the entomologists of the earlier part of the century, was that all names, in order to stand, must be accompanied by an intelligible description written in Latin." Mr. Dale does not say where he found this rule and it probably exists only in his fertile imagination. The British Association adopted a rule to the effect that only a name which has been associated with the insect by an adequate description or figure can be allowed to rank for priority, but nothing is said about the language to be used for the description.

The entomologists of the earlier part of the century did not follow either this rule or that formulated by Mr. Dale, for they based their nomenclature to a preponderating extent on the Vienna Catalogue, a work in which there is not a word of Latin save for the generic and trivial names, and which, in the case of the vast majority of the insects with which it deals, contains *no descriptions at all.*

Moreover, even Mr. Dale himself, as will be presently shown, gives his rule the go-by when, by so doing, he can get an opportunity of a thrust at Staudinger.

Mr. Dale next comes to that pet aversion of the Anti-Staudingerians, Hufnagel, whose name he does not spell correctly, apparently confounding the Hufnagel of the Berlin Magazine with the Hœfnàgel of a century earlier, whose works are alluded to by Linnæus.

Mr. Dale evidently does not know Hufnagel's descriptions at first hand and has apparently never heard of Von Rottemburg's expansions of them.

We next come to the *Sinon-Podalirius* question. Upon this, the first thing to be said is that Mr. Dale misquotes Staudinger. It is true that in the body of the Catalogue the synonymy stands as given by Mr. Dale, but in the addenda and corrigenda at the end of the volume, which Staudinger requests his readers carefully to consult, and which Mr. Dale ought to have consulted, he corrects this to *Podalirius*, L., S.N., X. 463 (adnot) which is exactly what Mr. Dale says he ought to have done.

Then Mr. Dale gets into a hopeless muddle. Having given *Podalirius*, L. 1763, as a quotation from Staudinger, he goes on to say: "It appears that Staudinger took it for granted that the name *Podalirius* was given first in the 12th edition of the "Systema Naturæ" and was in such a hurry to upset the rule instituted by the British Association that he neglected to look up the other editions." Mr. Dale is in such a hurry to prove Staudinger wrong that, as we have seen, he did not take the trouble to consult the appendix, and now appears to have forgotten the date of the 12th edition, which is 1767 and not 1763. The work, to which Staudinger is here alluding, is the Museum Ludovicæ Ulricæ, which, as it happens, is the first work in which Linnæus *describes Podalirius.* Now, if Mr. Dale be consistent, he ought to reject the 10th edition of the "Systema" as an authority on this species because it does not contain a description of it. The species is not included in the text at all but in a footnote on page 463 is a statement that many hold *podalirius* and *protesilaus* to be synonymous —so that after all, Poda in 1761, was the first to describe the insect.

Mr. Dale next plunges into the question is *hyale*, L. our *hyale* or *edusa.* He gives correctly the diagnosis of *hyale* from the 12th edition, if, however, he had consulted the description in the "Fauna Suecica," he would have found something pertinent to the solution of the question. He states that the references given by Linnæus are all to figures of *edusa*, and at once concludes that he has settled the question.

Here, in passing, we must note the extraordinary error he makes in giving *edusa*, Fab. 1776, as having anything to do with the insect we know by that name. This error is inexcusable if it be the fact as stated by Mr. Robson in the "Young Naturalist" for 1888, p. 86, that Mr. Dale has a copy of the 'Genera Insectorum,' and can only be due to the fact that Mr. Dale has never taken the trouble to study the description given in that work of the insect therein named *edusa*; had he done so, he would have recognised that it is a description not of the insect we know as *edusa*, but, as Fabricius himself states in his next published work, the 'Species Insectorum' 1781, of *daplidice.* It results, therefore, that unless *hyale*, Linn,=*edusa*, Fab., the earliest name for the latter insect, "associated with an intelligible description *in Latin*" is *Croceus*, Fourcroy, 1785, as stated by Kirby.

But is *hyale*, L.=*edusa*, Fab. Mr. Dale correctly states that Esper thought so, and probably Borkhausen (1788) and Schneider, who generally follow Esper, did so in this case.* Mr. Dale states correctly that Hubner in his plates figures our *hyale* under the name of *palæno* and our *edusa* under the name of *hyale*, but apparently he does not know that in his text published in 1805, Hubner corrects this nomenclature and gives the name *hyale* to the insect he had figured as *palæno*, and *edusa* to the insect he had figured as *hyale*; nor does he show any acquaintance with the statements of Donovan in his 7th Volume, published in 1798, that the insect in the Linnæan Cabinet (then in the possession of Dr. Smith) labelled *hyale* was undoubtedly the insect we know by that name. If this statement be accurate it would appear to settle the question, as it is hardly likely that at that early date the Linnæan collection would have been tampered with, as it is said to have been more recently.

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* Borkhausen, however, corrects himself in the following year, and adopts *hyale* for the insect we know by that name.

It is evident that if Mr. Dale wishes to become an authority on the subject of nomenclature, he must study his authorities much more carefully than he has done hitherto.

Canonbury, London.

ENTOMOLOGICAL NOMEMCLATURE.

BY C. W. DALE.

(Continued from page 53.)

Coming just after the genus *Colias* in Staudinger and Wocke's catalogue we find *Rhodocera*, B., as the genus of *Rhamni*, L. Here is a direct violation again of the law of priority. The correct synonymy is:—

Gonopterex, Leach, 1815.
Rhodocera, Boisduval, 1836.
Gonopterex, Westwood, 1839.

Another error committed by Staudinger and others, another is to give *Papilio*, L. as the generic name of the Swallow-tailed Butterflies. Linnæus idea of genera were very different from our own. His genera corresponds more to our families, and it would be just as correct to give *Papilio*, L. as the genus of *Io* as of *Machaon*. Our modern idea of genera did not originate till after the year 1800. The synonymy therefore ought to be:—

Papilio, Fabricius, 1807.
Amarayssus, Dalman, 1806.

Now we come to the family *Lycænidæ*, which Fabricius (in Illiger's Magazine, 1807,) divided into two genera—*Thecla* for the Hair-streaks and *Lycæna* for the Coppers and Blues. Schrank in 1801, bestowed the name of *Cupido* on the *Lycænidæ*, but it cannot be retained, as it would apply equally to the Hair-streaks and Blues. Fabricius' genus *Lycæna* has been cut up into two genera, or rather sub-genera—*Chrysophanus*, Hübner, 1816, for the Coppers; and *Polyommatus*, Latreille, 1817, for the Blues. *Polyommatus*, meaning many eyed, is more typical of the Blues than Coppers; therefore there seems no reason for modern authors restricting *Polyommatus*, to the Coppers and *Lycæna* to the Blues. Another reason why *Cupido* should not be employed as a generic name is because it is employed already by Linnæus as a specific name for one of the Hair-streaks.

In the "Systema Naturæ" Linnæus described a species of *Papilio* thus:—"*Argus*, 232, P-P. alis ecaudatis cœruleis; posticis subtus limbo ferrugineo: ocellis cœruleo-argenteis, Fn. Suec. 1074. De Geer ins. t. 4. f. 14. 15. Wilk. pap. 63. t. 1. Roess. ins. app. 1. t. 37. f. 3. 4.

Merian eur. t. 153. 174. Mouff. ins. 106. f. 1. Hœffn. ins. 1. t. 4. Robert ic. t. 17. Pet. Gaz. t. 35. f. 1. Raj. ins. 131. n. 11. Jonst. ins. t. 6. f. penult. Geoff. Paris. 2. p. 61. n. 30. B. P. Idas alis ecaudatis cœruleis: posticis fascia terminale rufa ocelari; subtus pupillis cœruleo argenteis. Fn. Suec. 1075. Raj. ins. 131. n. 12. Papilio parvus, alis supinis pullis cum ordine macularum lutearum ad imum margineum. Roess. ins. app. 1. t. 37. f. 6. 7. Geoff. ins. 2. 63. n. 38. Habitat in Europa, Africa. Femina est. B."

Linnæus' description might do for more species of Blue than one, so I turn to the works he gives reference to, of which I possess seven. Wilks. pap. 63. t. 1. Excellent coloured figures of *Icarus*, Rott. male and female, both of the upper and under side. Roesel, ins. app. 1. t. 37. f. 3-4. Capital coloured figures of *Icarus*, Rott. male and under side. Merian, ins. t. 153-174. Poas figure of *Icarus.* Mouffett ins. 106. f. 1. Figure too poor to determine. Petiver Gaz. t. 35. f. 1. Figure apparently of *Icarus.* Ray. ins. 131. n. 11. "The most common small blue Butterfly. The little blue *Argus*, Mus. Pet. 318. Diurnarum minimarium quarta Mouffetti. 105."

Geoffroy, *Ins. Paris*, n. 61, n. 30, "*L. argus*, blue, Longuer, 6 lignes, Largeur, 14 lignes". Pet. Gaz. Papiunculus cæruleus vulgatissimus. Geoffroy gives a long account of it, in which he states that it is a very common species in fields, and gives an account of its variations.

Now I turn to Staudinger's Catalogue, and find that he gives as localities for *Argus*, L. Europ. (exc. Angl. ?) As. min., and that he gives it as being the same species as *Argyrognomen*, Berg., which is the same as *Amphion* of Fabricius. Now the latter species does not occur in Britain, and yet Linnæus refers to Ray's and Petiver's description of a species which they say is the most common blue butterfly, and which is *Icarus*, Rott., which *Staudinger* gives as a distinct species from *Argus*, *L.*

The proper synonymy therefore is:—

Argus, Linn., 1758.
Icarus, Rott., 1775.
Alexis, W.V., 1776.
Argus, Bork., 1789.

Under the same genus, we find in Staudinger's Catalogue the nonsense names of *Bellargus* and *Semiargus* given by Von Rottemburg in 1775. Now what is the meaning of these names? Argus was the hundred-eyed guardian of Juno. Belle is a French word signifying beauty, as La Belle Isle. Semi means half. Are these utterly unclassical names, for the sake of one year's priority, to be used instead of the euphonious and classical names of Adonis and Acis? After all, is one year of such very great and vital importance? Perhaps some day we shall have such names proposed as *Bellmachaon* or *Semimachaon.* Kirby uses *Thetis*, Esp., 1778, for *Adonis.* Lewin in 1775 uses *Cimon* for *Acis.* Another foolish name in the same genus is that of *Minimus*, Fuessl, 1775, a totally false and misleading appellation. Fabricius, recognizing the absurdity of the name, adopted that of *Alsus*, W.V., 1776. *Trochilius*, not *Alsus*, is the smallest European butterfly. An equally foolish name was given to a bird in 1790 by Latham, that of *Algialtis indicus;* but we find in the "Zoologist" for 1888, p. 417, that preference is given to the name *Algialtis tricollaris*, Vieillot, 1818. The name *Indicus* was given on the supposition that the bird came from India, but investigation has shown that it is a species generally distributed over a large portion of the African continent.

Now we come to a species, still of the same genus, with a plurality of names:—

Alexis, Scop., 1763.
Agestis, W.V., 1776.
Medon, Esper., 1777.
Astrarche, Berg., 1779.
Idas, Lewin, 1795.
Artaxerxes, Fab. Var., 1793.
Allous, Hub. Var. 1816.
Salmacis, Steph., Var., 1831.

Here is Scopoli's description:—"P. Alexis—longa lin., 6 ad 8, lat., 3¾—5, Diag. Alae supra fuscæ, fimbria alba; posticæ utrinque maculis crocatis. In sylvestribus."

Then follows a description of four varieties. His figure agrees with our *Agestis.* De Villiers in 1789 gave a good description of *Medon.* Esper did not give the name himself, but took it from Huffnagle, thus carrying that name back to 1776. Staudinger, however, doubts whether Huffnagle's insect was really this species, but there is no doubt as to it being the *Medon* of Esper, and that gives *Medon* precedence over the name *Astrarche*, which he adopts. Newman prefers *Medon*; Stainton uses *Agestis*, which was also adopted by Stephens and Curtis, while Lewin and Haworth called it *Idas.* This is certainly a case which might be settled by the "Law of Priority," yet Mr. South in his "Synonymic List of British Lepidoptera" preferred to follow Staudinger rather than be guided by the motto on the title page—"Compiled in conformity with the law of priority."

Another of the genus appears in Staudinger's Catalogue under the name *Argyrotoxus*, Bgstr., 1779. This is the name selected by Staudinger to supersede that of *Ægon*, W.V., 1776, but it is an utterly unrecognized name, not even appearing in Jung's Alphabet. It is also very doubtful which species the name was originally applied to. This species was supposed by Fabricius and many of the old authors to be the *Argus* of Linnæus, but as I have shown before, the figures he refers to are those of *Icarus*. Wallengren also (Rhop. Scand.) refers this species to *Argus*, as the other critical species is a great rarity in Sweden. Linnæus says in Faun. Suec. that *Argus* is "caudatis," evidently an error, which is corrected in a later work. What appears to be most probable is that Linnæus included both *Icarus* and *Ægon* under the name *Argus*. On the other hand his successors may have made the same mistake as they did in reference to *Hyale*. With regard to this species, South has acted wisely in not following Staudinger.

Now let us turn to the genus *Erebia*, of Dalman.

In 1775, a butterfly was called *Papilio medea* in the Vienna Catalogue.

In 1776, Hubner figured it under the same name.

In 1777, Esper called it *Papilio æthiops*.

In 1787, Fabricius called it *Papilio Blandina*.

In 1832, Dalman called it *Hipparchia neoridas*, and the three earlier names were disused by this most talented and learned author.

Staudinger rejects the name of *Medea* for the reason, as he states, that the *Medea* of the Vienna Catalogue and of Fabricius was another butterfly.

Here I fail to follow him. Fabricius expressly states that his *Blandina* is identical with *Medea*, W.V., and Staudinger gives *Æthiops* as being identical with *Blandina*, Fab.

Staudinger uses the generic name of *Satyrus* for *Semele*. The synonymy however is :—

Hipparchia, Fab., 1807.
Satyrus, Boisd., 1840.

Megæra, L., is the species for which the generic name *Satyrus* ought to be used.—Le satyre is the French name.

Linnæus in the "Systema Naturæ" described a butterfly thus :—"Maturna 204, P.N. alis dentalis purpurascentibus nigro maculatis ; subtus fasciis tribus flavis. Fn. Suec. 1062., Pet. gaz. t. 1. f. 8., Ray ins. 120. n. 8., Merian Eur. t. 88 ? Wilk. pap. 58. t. 2. 2. 9., Habitat in Corylo, Erica, Scabiosa."

The references to Wilkes are excellent figures of the upper and undersides of *Melitæa athalia*, Esper. Petiver's figure is also that of *Athalia*. Here is Ray's description, f. 120. n. 8., "Papilio medea, alis superiris rufis, lineis tenuibus nigrescantibus deorsum secundum nervos ductis aliisque transversis latioribus variis. Papilio fritillarius tessellatus serotinus. The May Fritillary Pet. Mus. 323."

According to the strict law of priority the synonymy of this species should be :—

Maturna, Linn., 1766.
Athalia, Rott., 1775.
Maturna, W.V., 1776.

The Linnæan description of *Hesperia comma* in "Systema Naturæ" is:—"Comma. 256, P.P. alis integerrimis divaricatis fulvi: punctis albis lineolaque nigra Fn. Suec. 1080. Scop. Carn. 463., Geoffr. Paris. 2.66. n. 37., Merian Eur. 15. t. 48. Ray ins. 125. n. 21.22. Poda ins. 79. n. 51. P.P. sylvestris. Habitat in Europa."

Now these references all relate to *Linea*, W.V. therefore the synonymy should be:—

Comma, Linn., 1757.
Sylvestris, Poda., 1861.
Thaumas, Rott., 1775.
Linea, W.V., 1776.

The effect of this would practically render our *Comma* nameless. Therefore if this law of priority be carried out to its utmost extent, two of our British butterflies without names.

In five instances, Mr. South has not complied with this law of priority among the small number of British Butterflies.

Far less confusion would arise if we followed the example of the earlier race of Entomologists, and took 1793, the date of the great work of Fabricius as the starting point. Then we could write *Edusa*, Fab., *Hyale*, Fab., and *Comma*, Fab. To my mind the law of usage ought to override the law of priority.

If we suppose the law of priority to be carried out, there are at least four dates set up by different authorities as the period when Entomological Nomenclature ought to begin.

1735.	Mr. Crotch for Genera.
1751.	Dr. Thorell.
1758.	Staudinger & Wocke. Gemminger & Harold.
1768.	British Association. Mr. Kirby.

Besides these, Mr. Kirby has shown ("Entomological Monthly Magazine," Vol. VIII., p. 142), that specific or trivial names were first used by Linnæus in 1746. This date must therefore be added to the list of those where Entomological Nomenclature ought to commence. Some of the names given in 1746, rejected subsequently by Linnæus himself, were it seems, subsequently adopted by Retzius, Esper, and others. But, if we go back to 1746, we shall have to adopt *Ammiralis* for *Atalanta* and *Principissa* for *Lathonia*. Why, therefore, not go further back still to 1717, and adopt Petiver's name of *Oculus pavonus* for *Io*, and *Oculatus hampstediensis* for *Velleda*, unless we go still further back to 1633, and call *Io* the *Omnium regina* of Mouffet. If it be objected that these are dual names, so the *Pavonia-minor* and *Pavonia-major* of Linnæus, or the varietal names adopted in America, such as *Rapæ novangliæ*, &c., are likewise dual.

Reports of Societies.

ENTOMOLOGICAL SOCIETY OF LONDON.

June 7, 1893.—H. J. Elwes, Esq., F.L.S., F.Z.S., President, in the chair. Mr. George Willis Kirkaldy, of St. Abbs, Worple Road, Wimbledon, S.W., was elected a Fellow of the Society. Mr. W. C. Boyd exhibited varieties of *Fidonia piniaria* and *Thecla rubi*, taken at Bournemouth on May 20th, 1893. Mr. C. O. Waterhouse exhibited certain large galls on oak-leaves from Mexico, one of which was apparently produced by a species of *Cynipidæ*. Mr. A. Cowper-Field exhibited varieties of *Smerinthus tiliæ*, bred between 1890 and 1893, under various conditions of temperature, those which had been exposed to a lower temperature being much darker than those which had been exposed to a higher. Mr. Merrifield made some observations on the subject, and remarked that, as far as his experience went, no hard and fast rule could be laid down with regard to the production of the lighter or darker colourings, as a high temperature sometimes produced dark forms. Mr. W. M. Christy exhibited a series *Zygæna trifolii*, including very many yellow forms, all, with one exception, taken at one spot during the latter half of May, 1893, and belonging to one colony. Some of the specimens were more or less incomplete, both in structure and colour, and Mr. Barrett stated as his opinion that this was due to their having been forced by the unusually fine weather. Lord Walsingham, Mr. Merrifield, and others took part in the discussion which followed. Canon Fowler exhibited cocoons and specimens of *Coniatus suavis* var. *chrysochlora*, Luc., taken by Lord Walsingham in great abundance on the flower-shoots of tamarisk in the West of Italy. Mr. Chitty exhibited black varieties of the following Coleoptera from the slopes of Ben Cruachan, N.B. :—*Carabus violaceus* and *arvensis*, *Pterostichus versicolor*, *Phyllopertha horticola*, and *Telephorus figuratus*, and stated that the latter seemed a permanent race, as it occurred both in 1892 and 1893. The President remarked on the great abundance of *Coleophora laricella* in Gloucestershire, and stated that they were committing great ravages among young larches. Lord Walsingham stated that he had seen young larches at Carlsbad completely bleached by this moth. It was suggested by several Fellows of the Society that care should be taken to observe the occurrence of second broods of insects during the year. Mons. Wailly exhibited a collection of Lepidoptera, Coleoptera, and Orthoptera from New Zealand. A discussion followed, in which Lord Walsingham, Dr. Sharp, Mr. McLachlan, Mr. Durrant and others took part. Mons. Wailly further exhibited cocoons of various silk-producing Lepidoptera, and stated that the larva of *Attacus pernyi*, whose food-plant is oak, had been reared in Trinidad on *Terminalia latifolia*.—W. W. Fowler, *Hon. Secretary.*

CITY OF LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY.

Tuesday, 6th June, 1893.—Exhibits. Mr. Clark, a bred specimen of *Cerura bicuspis* and cocoon of same, a male *Pieris brassicæ*, with a black central spot on the forewings, some fine confluent forms of *Syrichthus alveolus* from Abbots Wood, and a bred series of *Eupæcilia ambiguana* from the New Forest. Mr. Battley, living larva of *Anthocharis cardamines*. He remarked that these larvæ were very easy to rear, and fed up very rapidly, arriving at their full size in about four weeks. Mr. Tremayne, living larvæ of *Amphidasys prodromaria* and others from the New Forest. Mr. Hollis, *Adela viridella*, *Nemophora swammerdammella*, and a bred series of *Ephyra punctaria*. Mr. Gregor, *Abraxas ulmata*. *Ligdia adustata*, *Asthena blomeraria*, &c. Mr. Bacot, a bred series of *Demas coryli*, including one specimen without the dark central band; also young larvæ of *Saturnia carpini.* He remarked upon the great variability of these larvæ, and stated that while the green forms harmonized well with the hawthorn leaves, the black larvæ, when lying side by side on a leaf, completely hid it, and gave it the appearance of a hole in the hedge. Dr. Sequeira, several species of butterflies without the usual spots on the upper-side. These included *Pieris rapæ, Chortobius pamphilus*, *C. davus*, and *Satyrus hyperanthus.* Capt. Thompson, a dusky specimen of *Ennomos angularia*, *Platyptaryx falcula* with gold scales, and a living bred specimen of *Phorodesma bajularia.* Mr. Riches, dark specimens of *Hemerophila abruptaria.* Mr. Huckett, a bred series of *Pericallia syringaria.* Coleoptera: Mr. Clark, *Ocypus cupreus*, *Rhagium inquisitor*, *Balaninus villosus*, &c. Mr. Heasler, *Tiresias serra*, bred from larvæ found under bark last Christmas at Richmond Park. Mr. Pearson, *Blaps similis*, *Sphodrus leucophthalmus.* Mr. Lewcock gave an account of an excursion to Woking and Farnham at Whitsuntide.

Tuesday, 20th June, 1893.—Exhibits: Mr. Clark, larvæ of *Endromis versicolor*, a dark variety of *Hemerophila abruptaria* from Hackney, and specimens of *Spilosoma menthastri* with very few black spots. The latter were bred from a sparsely spotted specimen captured in the New Forest, but the majority of the brood were normal, only two or three following the ♀ parent. Dr. Buckell, examples of the two broods of *Ephyra punctaria*, and series of *Eupithecia centaureata*, on which he read some notes. Mr. Battley, a pupa of *Anthocharis cardamines* and three melanic specimens of *Stauropus fagi*, bred from eggs found at Epping Forest. He pointed out that the dark colour was chiefly developed on the upper wings and the front margin of the hind wings, these being the parts exposed when the insect is at rest. Mr. Bacot, a melanic specimen of *S. fagi*, bred from an Epping Forest larva, also *Notodonta trepida*, and young larvæ of same from the New Forest. Mr. Tremayne, *Vanessa polychlorus*, *Bombyx rubi*, &c., from Epping Forest. Capt. Thompson, a melanic specimen of *Chrysoclysta linneella*, and a series of *Phorodesma bajularia* from Epping Forest. Coleoptera: Mr. Heasler, *Toxotus meridianus*, *Molorchus minor*, and *Cryptocephalos fulcratus.* Mr. Lewcock, *Telephorus paludosus* received from Mr. A. J. Chitty; also various species from Woking and Farnham. Dr. Sequeira stated that he had visited Wicken Fen, and found *Papilio machaon* in all its stages, it having been on the wing since the beginning of April. Mr. Battley stated that two larvæ found in the stems of ribbon-grass, and which he had thought to be *Apamea ophiogramma* had emerged, and were *Miana strigilis* var. *æthiops*, the only difference noticed in the larva being that *strigilis* had faint traces of longitudinal lines. Mr. Tremayne reported that some larvæ of *Clostera anachoreta* had spun up, and the imagines emerged eight days after. Mr. Smith had bred *Thecla quercus* from larvæ taken in the New Forest at Whitsuntide.

THE SOUTH LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY.

June 8th, 1893.—J. Jenner Weir, Esq., F.L.S., President, in the chair. Mr. F. W. Frohawk exhibited a variety of *M. artemis*, a most remarkable form, especially on the underside, the normal orange-tawny colouring being replaced by a fulvous brown, and the markings of the outer half of the secondaries being almost entirely missing, also a somewhat similar aberration of the same species on behalf of Mr. Carpenter. Mr. H. A. Auld exhibited a specimen of *S. urticæ*, which was deficient in the usual row of black spots down the centre of the body, also a bred series of *P. vitalbata.* Mr. R. Adkin showed a splendid box of *A. nubeculosa*, from Rannoch, bred 1893, two being from larvæ fed up in 1890, and the remainder in 1891, Mr. Adkin stating it was not an uncommon thing for this species to remain two years in the pupa. Mr. Weir referred to the view held by some, that certain species resisted any forcing when pupæ, and instanced the second brood of *P. napi*, in this respect, Mr. Barrett stating it was of the utmost importance that a species like *A. nubeculosa* should have the power of delaying their emergence should the weather be too unfavourable. Mr. Weir exhibited a specimen of *Aporia cratægi*, one of four taken by him in the early part of June, 1839, at Keymer, Sussex, it being then abundant. In 1840 in the same locality he saw but one, and in subsequent years none at all. This specimen he generously placed in the Society's collection. Mr. Weir also said that large numbers of this species, bred from Continental pupæ, had been liberated in the neighbourhood of Windsor. Mr. Frohawk recorded the extraordinary fact of *L. sibylla*, having been taken in the New Forest on the 22nd May.

FIELD MEETING held on Saturday afternoon, June 10th, at Oxshott, under the guidance of Mr. R. South. The railway is very convenient at this spot for it lands one right on the collecting ground. Turning to the left on leaving the station the members quickly dispersed, and among the scattered fir and birch trees *Eubolia palumbaria*, was noted in fine condition; *Epinephele janira*, *E. tithonus*, *Cænonympha pamphilus*, *Syrichthus malvæ*, and one or two *Lycæna ægon*, represented the Rhopalocera; from the heather *Fidonia atomaria*, which has been about so long this year, a few *Aspilates strigillaria*, and an odd specimen of *Nemeophila russula*, were disturbed; while the denser portion yielded *Cabera pusaria*, *Acidalia remutaria*, *Asthenia candidata*, *Camptogramma bilineata*, and *Lomaspilas marginata*. In this part of the heath the sundew (*Drocera rotudifolia*) flourished, and many patches of the parasitical dodder (*Cuscuta epithymum*) were seen. On entering the fir woods proper, going North, members were astonished at the vast numbers of *Fidonia piniaria* and *Thera variata*, which the beating stick produced, many of the former being in fine condition. On the trunks *Scoparia dubitalis* and *L. truncicolella* were present; one *Ellopia fasciaria*, a few *Macaria liturata* in fine condition, and plenty of *Eupithecia indigata*, almost unrecognisable. *Iodis lactearea* was flying, and *Retinia pinivorana* was reported. Specimens of the coleopterous family Coccinellidæ were observed in all four stages, the pupa stage of *Coccinella oblongo-guttata* being especially noticeable both for its striking colour and its power of suddenly standing at right angles to the trunk of the tree when disturbed. At length we reached a hedge of variable growth bordering the fir wood and here *Aplecta nebulosa* and *Melanthia albicillata* were taken from the trees; full fed larvæ of *Trachea piniperda* were beaten, and *Melanippe montanata*, *M. sociata*, *Larentia viridaria*, and *Ebulea sambucalis* were driven out, while *Tortrix viridana* was certainly there. Turning sharp to the left we reached a damp situation where the bog myrtle (*Myrica gale*), so attractive to Lycænidæ, grows with the marsh violet (*Viola palustris*), and the penny-wort (*Hydrcotyle vulgaris*). Here was obtained *Cataclysta lemnata* and *Hydrocampa nympheata*, with a solitary specimen of *Leucania impura*. Under the spreading fir trees near, were several night-jars (*Caprimulgus Europæus*), whose eggs were unsuccessfully seached for. Now a beautiful piece of undergrowth was reached, which, with the adjoining palings, produced considerable numbers both of species and specimens. *Melanthia ocellata*, *Phorodesma bajularia*, *Tephrosia punctularia*, among the Geometers, and *Triphæna pronuba*, *Noctua C-nigrum*, *Agrotis exclamationsis*, &c., among the Noctua were added to our list. A solitary specimen of *Drepana unguicula* was taken and among the Micros, *Pædisca bilunana*, *P. corticana*, *Eupœcilia nana*, *Elachista argentella*. Many species found before were present here again, including a number of fine specimens of *Melanthia albicillata*. The road was now reached, and the party turned for tea. The walk produced *Coremia propugnata* on trnks, a single *Eupisteria heparata* from stunted alders and a nest of *Bombyx neustria*, strange to say feeding on a birch. After a hearty tea at the porter's cottage, we rambled over the heath taking abundance of *Pempelia palumbella*, with *Eupithecia nanata* sparingly, and one or two *Hadena porphyrea*; *Acidalia subsericeata*, was taken in some numbers just at dusk. The nests of a willow warbler (*Phylloscopus trochilus*), with five eggs, and a meadow pipit (*Anthus pratensis*), with three eggs, were found. A snake (*Natrix torquata*) had been seen by some members, and the lizard (*Lacerta vivipara*) was exceedingly common in sunny spots. Many thanks are due to Mr. Lewcock, who lost the train and did not join the party till the return journey, for the following notes on the Coleoptera. "I started to meet the 2.17 train, but just missed it by two minutes. Under the circumstances I decided to take the next train to Surbiton and walk round by the fields through Claygate to Oxshot, and collect by the way. I arrived at Surbiton at 3.15, and turned to the left, coming out of the station, making for the footpath which skirts the railway bank and eventually turned into Claygate Lane. Having on one occasion seen a specimen of *Megapenthes lunicollis* taken almost under my nose in this lane, I began working for it, but without success. However, I found a single *Mordellistena humeralis* sitting on Hieracleum flowers, and I may here record that I also obtained one on June 20th, 1891, at the Eynesford excursion. In other Umbelliferæ I found several *Grammoptera tabaccicolor*, a species common to this locality. In Elder blossom, one *Quedius cruentus* which occurs sometimes under bark, but only singly. Also several *Anthocomus fasciatus*, a pretty little red and black Malacoderm which is frequently found during June at Claygate. By using the sweeping net among the meadow plants, several *Ceuthorhynchus campetris* and *Prasocuris aucta* turned up, with a few *Ceuthorhynchus coehleariæ*, *Gymnetron pascuorum*, and several Apions. All these are common to this locality. Of course one meets with many species over and over again by working at one place, and it would be quite useless to record all the species found here; for instance, I met with ten species of Telephorus, and, with the exception of *T. fuscicornis* and *T. discoideus*, all are common. It may be worthy of remark that at Eynesford in 1891, *T. fuscicornis* was the commonest of the group in that district. Another very common beetle on birch, hornbeam, and a variety of things at Claygate is *Luperus betulinus*, and common it was on Saturday, falling literally in hundreds into the umbrella. The Black Pond was reached soon after 7 o'clock, but nearly all the Donaciæ had retired for the day, so that only *D. sericea*, with the intermediate forms to *D. comari*, were to be obtained. Two three or *Coccinella ocellata* were found on the reeds, and one or two *Erirhinus nereis*. The final capture was a nice specimen of *Cryptocephalus lineola*, making the third captured at this spot by myself. A great many odd and common things put in their appearance, such as *Adimonia capreæ*, *Strophosonius limbatus*, but these captures are decidedly uninteresting. I joined the party at Oxshott station for return journey at 9.27." So ended another very successful and pleasant field outing of the Society. The next meeting will be at Westerham, Kent, on July 15th.—HY. J. TURNER *(for the Committee)*; F. W. HAWES and H. WILLIAMS, *Hon. Secretaries.*

General Notes.

VARIETIES OF PAPILIO MACHAON.—I have bred about 30 *Papilio machaon*, two of which vary a little from the type. In one of them the black streak which closes the discal cell on the hind wing is double. The other has two of the black streaks in the fore wing joined, making a large black patch. Mr. Barrett mentions one of the former, and I saw another in Houghton's series at Wicken last year, of which he was very proud.—J. S. BRADY, Sunderland.

Z. MELILOTI.—I hear that Mr. Fletcher of Worthing, has obtained ova of *Z. meliloti* from New Forest parents, and that the larvæ agrees with Esper's description. This is interesting and important, and will be especially so to those who have always upheld the distinctness of the species. It will be remembered that our contributor Mr. F. N. Pierce, satisfied himself from an examination of the anal organs of the ♂, not only that it was distinct from any other British species, but that fertile union was not probable between it and any other. Mr. Fletcher not only obtained hybrids between the three commoner species, but found the hybrids fertile. He quite failed, however, in crossing *meliloti* with any other species.—JOHN E. ROBSON, Hartlepool.

ACHERONTIA ATROPOS AT HARTLEPOOL.—A fine specimen of *Acherontia atropos* was brought me on Whit-Monday, 22nd May.—JOHN T. BROWN, West Hartlepool.

STIGMONOTA DORSANA, NEAR ABERDEEN.—I took two specimens of *Stigmonota dorsana*, near Aberdeen, last week. I understand that very few of this insect have been taken in Britain during the last forty or fifty years.—ARTHUR HORNE, Aberdeen, 3rd June, 1893.

ISLE OF MAN.—Whilst collecting last evening (June 13th) in the garden adjoining Sulley Parsonage, I was most successful in taking a beautiful fresh specimen of *Plusia festucæ* whilst hovering over flowers of Red Valerian. This is the first specimen I have ever seen in the Island. The flowers of this plant have proved most attractive during the past ten days, and last evening about 9.30, I also took the following from the blossoms, *Plusia chrysitis*, *P. gamma*, *P. pulchrina*, *P. iota*, besides a few *A. triplasia*, *D. capsincola*, and *C. umbratica*.—H. SHORTRIDGE CLARKE, Sulley Parsonage, Lezayre, June 14th, 1893.

OXFORDSHIRE.—Nearly all insects are a month early. Sugar is a complete failure, probably owing to the great quantity of "honey-dew." Evening netting and beating by day produce a fair number of Grometers. Light does well in spite of East wind.—J. H. D. BEALES, Kiddington Rectory, Woodstock.

THE EARLY SEASON, COLEOPTERA.—You refer to the extraordinary season, but things seem scarce where I have been, though I have not had much opportunity. The dry weather has not produced either the number or quality of insects in Coleoptera it appears to have done in Lepidoptera. I went to Oxshott on May 5th, and took *Clytus mysticus*, *C. arietis*, *Polyopsia præusta*, *Grammoptera tabaccicolor*, and a good series of *Crepidodera helxines*. On 12th May, I went to Loughton for species of Rhynchites, but got none. Whit-Monday was a scorcher. I started for Woking and walked from thence to Farnham. The canal was teeming with *Donaciæ*. I took over a dozen *Donacia bicolora (sagittariæ)*, several of the typical *D. discolor (comari)*, 20 or 30 *D. thalassina*; caught two *Corymbites tessellatus* on the wing, and swept three others. Found a colony of *Galeruca sagittariæ*, three or four *Haltica ericeti*, *Telmatophilus* *typhæ*, *Stenolophus teutonus*, *Rhynchites uncinatus*, and *Bruchus ater* abundantly. On getting into Farnham, I turned my attention to the hop grounds and bagged about 25 *Pachyta collaris*. This was a tolerably good result altogether, but away from the water there seemed little besides *Anaspidæ*, and most of people seem to despise this group.

In the London district as defined for the City Society, Coleopterists have been doing well at the water. I hear of captures of *Blethisa multipunctata* by three of the City of London members, besides a host of other good *Carabidæ*. Mr. Burrows' captures of *B. multipuncta* being 18 on 3rd June. Three *Molorchus umbellatarum* have been captured near Elmers End; indeed, Coleopterists appear to have been having a good time generally.—G. A. LEWCOCK, London.

Some nice beetles have turned up near Cardiff during May and June. With the kind assistance of Canon Fowler's acumen, I am able to record especially *Aphodius tristis* (common), *A. sticticus*, *Mordellistena pumila*, *Malthodes atomus*, *M. misellus*, and at least three other *Malthodes*, *Chlaenius vestitus* and *Anthonomus ulmi*.—B. TOMLIN.

SUGARING.—A large number of forms of "Sugaring" results have reached me during the month, but, with one or two exceptions, very litlle has been secured by this mode of attraction. I propose to devote a considerable proportion of next issue to this subject, and will be glad to have as many papers sent in as possible. The general opinion is, that during the month of June, the attraction of flowers, and more particularly of "honey-dew," have been greater than that of our mixtures. Mr. Brady, of Sunderland, has sent the most successful return, but, as he sugared flowers, I am doubtful whether his insects were attracted by the flowers or by the artificial sweets spread thereon. It so happened that I was on our sand hills the same night. I found sugar on posts and rails absolutely unattractive, only three moths visiting 30 sugared stations. On unsugared flowers, however, at least 25 species of Noctuæ were to be seen, including all that Mr. Brady met with. I think this goes to show that it was the natural rather than the artificial sweets that were attractive. Mr. Brady sugars near Sunderland, only about 20 miles north of my collecting ground, and it is not likely there would be any meteorological or other conditions differing greatly in so short a distance.

If the failure of sugar in June be really caused by "honey-dew," possibly the recent heavy rains will make a difference in results, and I look with some eagerness for the reports for the next few days.

May I again urge workers to send in their returns, and to record failures as carefully as successes. I will be pleased to supply forms to any one.—JOHN E. ROBSON, Hartlepool.

3 JUL 93
BRITISH MUSEUM NATURAL HISTORY

ADVERTISEMENTS.

EXCHANGE.

A few mounted Duplicates of Aphodius tessulatus, A. tristus, Epuræa pusilla, Ips 4-punctata, Anthonomus ulmi, Malthodes, etc. Wanted—Aphodii and other British beetles.—B. Tomlin, The Green, Llandaff.

Exchange.—Duplicates—Cardamines, Napi, Brassicæ, Urticæ, Edusa, Sibylla, Alsus, Sylvanus, Lucina, Tages, Caja, Lubricipeda. Desiderata—Ova and Larvæ of Sphinges and Bombyces.—W. Harcourt Bath, Ladywood, Birmingham.

Duplicates.—Advena, Suffumata, Venosata. Desiderata—Very numerous.—W. Macmillan, Castle Cary, Somerset.

Duplicates. Loniceræ, Filipendulæ, Conigera, Tritici, Carpophaga, Capsincola, Cucubali, Elymi, Testacea, Zonaria, Ulmata, Biundularia, L. marginata, Ministrana. Desiderata—Very numerous to enlarge series.—John E. Robson, Hartlepool.

Wanted.—Can any of my correspondents send me a Hornet—J. E. Robson, Hartlepool.

Wanted for types (condition immaterial)—Piceana, Scabrana, Mixtana, Capræana, Sellana, Marginana, Striana, Hybridana, Nisana. Will pay postage and do best I can in return.—W. Macmillan, Castle Cary, Somerset.

Types for beginners.—Have numerous duplicate moths to give away. Send box and return postage.—W. Macmillan, Castle Cary Somerset.

What offers for "Young Naturalist," Vol. I. to XI. (1890) bound in half roan, also "Bristish Naturalist," 1891, half roan, 1892-3, unbound. "Entomologist," 1888-9, half calf, 1890-3 unbound. "Zoologist," 1890-1, half calf, 1892-3 unbound. "Entomologist's Record," Vols. I., II., half calf, Vols. III. and IV. unbound. "British Noctuæ and their Varieties," 4 Vols. Merrin's Lepidopterist's Calendar (interleaved). Dallas' Elements of Entomology. Naturalists' Gazette, Vols. I.-III. half roan, and Jardine's Naturalists' Library, 31 Vols. 1st edition hand-painted?—D. S. Steuart, Owen's College, Manchester.

Desiderata.—Sinapis, Th. rubi, W. album, pruni, iris, Trochilium, all but tipuliformis, fuciformis, bombyliformis, porcellus, elpenor, ligustri, rubricollis, complana, lurideola, pygmæola, deplana, aureola, griseola, muscerda, mesomella. Duplicates numerous, a list on application.—John E. Robson, Hartlepool.

Exchange.—Wanted—Magic Lantern Slides of Insects. Any order, and either eggs, larvæ, pupæ, perfect insects, or dissections desired. Will give Lepidoptera in return, or Cash.—John E. Robson, Hartlepool.

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THE "MELANISM" CONTROVERSY.

BY W. E. SHARP.

It is with considerable diffidence that I venture to add to the embarrassing wealth of opinion, which this problem of the cause of melanism among insects has evoked. Having, however, read most of the literature of the subject, including Mr. Tutt's monograph[1], Mr. Robson's criticism[2] of that work, and lastly Mr. Tutt's rejoinder[3]; it has occurred to me, that the view this question assumes to one who compensates for the disadvantage of not being a specialist in Lepidoptera, by the advantage of having neither preconceptions to sustain, nor theories to enunciate on the subject, might not be quite devoid of interest.

This problem, that of the origin of *Melanism* (and in this article I use the word as expressing what is meant both by Melanism and Melanochroism), is undoubtedly one of the greatest interest. It submits to our consideration a series of the phenomena of vitality, definite in character, and capable of investigation; whose true solution would vastly extend the limitations of our knowledge of the obscure processes involved in that differentiation of form which we call the origin of species.

As such then it merits the attention of all biologists.

Now, in any scientific enquiry, perhaps the highest essential is an extreme accuracy and lucidity of thought; and in all scientific controversy more especially, that perfect adjustment of thought to expression, which leaves the reader in no doubt as to the exact meaning of the writer.

These fundamental requisites appear to me to have been considerably neglected by most of the writers on this subject of melanism, and the defect seems nowhere so apparent as in the writings of Mr. Tutt.

Let me then point out what I hold to be an initial confusion of thought, by briefly defining the problem to be attacked. It is two-fold.

(1) *a.* Certain species of Lepidoptera and Coleoptera[4] of general distribution, exhibit in the British Islands, a tendency to melanism in Northern districts, in Ireland and Man, and at high altitudes.

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1. "Melanism and Melanochroism in British Lepidoptera," by J. W. Tutt, F.E.S. Swan Sonnenschein & Co., 1891.
2. See "British Naturalist," Vol. III., p.p. 61-64 and 65-71.
3. See "Entomologist's Record," No. 5, Vol. IV.
4. I omit, as far as possible, lists of specific names, as I apprehend that there is no material difference of opinion among Entomologists as to the species affected by Melanism and Melanochroism.

Also *(b)* species *restricted* in range to such localities are generally melanic in coloration.

(2) Certain species of Lepidoptera and possibly of Coleoptera[1], in districts influenced by the atmospheric pollution caused by manufactures, mining operations, &c., have, *within recent years*, assumed a distinctly melanic character, which has apparently arisen and become intensified synchronously with the establishment and increase of such atmospheric pollution.

Now it is obvious that we have here two entirely distinct classes of phenomena. The factors which induced them need not necessarily have been the same or even similar, the theory by which one kind of melanism may be explicable need not of necessity solve the other.

Mr. Tutt may have kept this distinction clear in his own mind, but he has hopelessly confused the readers of his "*Melanism*," by attempting to explain both classes, by his theory of humidity similarly applied. Before pointing out the utter inconsistency of such a line of argument, let us consider for a moment the differing nature of the two forms of melanism as defined above, and which I have called 1 and 2.

It will be seen that *a* and *b* of No. 1 may be considered as equivalent, the only real difference being in whether we call a special form, species or variety.

Considering, then, archaic melanism (No. 1), the first and most obvious remark is, that we have no right to assume the present environment, whether of cold, deficient sunlight, humidity, any of the characteristics in fact, of the localities where such cases occur, to have been the *actual cause* of their normal variation taking the melanic direction. We may say that their melanism is *adapted* to the environment, but not that it has been necessarily *caused* by it. The distinction is an important one. Let us take an instance. The Shetland male of *Hepialus humuli* is Melanochroic, our common form pure white, but is it safe to assume the latter to be the type? By type I mean earlier form; preponderance of individuals does not indicate it, otherwise we should have now to regard the form *doubledayaria* as the type of *Amphidasys betularia.* Antiquity is doubtless the test; but from what evidence we have (comparison with other members of the genus), we might with some justice infer that the dark northern form of *H. humuli* ♂ was the original, and our white male the result of a later evolution.

Now hereby it is apparent how this class of melanic phenomena differs in essence from No. 2, viz., that we have *no evidence of origin* of the melanism. Thus, suppose someone should promulgate such a theory as this, as in point of fact, Dr. Buchanan White, Mr. McLachlan, and others have done. The original post glacial insect population of the palæarctic region was for some reason or other—of which we provisionally profess ignorance—melanic in character. The forms we find now numerously in Ireland and in Great Britain, more especially at high elevations and northern latitudes, represent the survivals of that first sub-glacial population, and are melanic now because those their progenitors were melanic then. Succeeding waves of immigration, now of general lowland distribution; represent, not the original types, out of which by atmospheric or other influences, were manufactured our present melanic forms, but races perhaps ages later in differentiation, at any rate, races always restricted to less rigorous temperatures or perhaps drier areas.

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[1] I was unaware of any instance of this class of melanism among Coleoptera till I recently discovered that the form of *Bradycellus cognatus*, at Lindow, near Manchester, was distinctly melanic, but I have no evidence as to how long this form has occurred there.

Now such a theory as this would be perfectly comprehensible, and not conspicuously inadequate; it would indeed merely push back the necessity for accounting for melanism, to a time when atmospheric conditions were very different from what they are in Europe to-day, but it would render Mr. Tutt's invocation of the humidity of our western districts entirely needless.

But now, on the other hand, consider Melanism, No. 2, the recent kind. Here no such theory can be advanced. We seem to have seen the species change almost under our eyes. Personally, I think we are at present a long way off a right explanation of this matter. I look on the evidence of association between a smoky and polluted atmosphere and the occurrence of these forms, to be insufficient and uncritical (not necessarily therefore incorrect).

Probably the two districts which have been now for the longest time and most completely under the influence of the disturbing effect of manufactures, mines, &c., are South Staffordshire and East Worcestershire, and the coal-fields of South Wales. Have we any evidence of distinct melanism from these districts? There can be no doubt but that the pall of smoke, which has now for nearly a century, obscured the sky above that district commonly called the "black country," ought to have had a much greater effect, than the mild and comparatively recent emanations of Derby or Huddersfield.

Again, Delamere forest has been cited as a special district for the melanic change in several Geometers, but the idea of any special smoke-produced obscuration of the sky above, or defilement of the herbage beneath, to any one who knows those woodlands, is absolutely absurd. The forest of Dean, with its long established iron-works and collieries quite within the circle of its woods, should have been much more effective in the production of melanism, but I do not remember to have heard cases quoted from that district. Possibly Mr. Tutt may explain these discrepancies by a difference in rain-fall, I however point them out to show how very far from completely proven is this association of melanic forms and smoke polluted skies. However, dismissing such doubts for the moment, let us accept as correct the definition of Melanism No. 2, as given above, and let us examine for a moment Mr. Tutt's theories and consider how they fit the facts of the case as admitted by himself.

Careful perusal of "Melanism and Melanochroism" certainly leaves the reader under the impression that Mr. Tutt ascribes all melanism of every kind *principally* to humidity, and his reply to Mr. Robson's criticisms,[1] a reply in which he has allowed himself to adopt a tone happily rare in Entomological dialectics, does not remove that impression, although its evident animus deprives it of any argumentative value.

To the potent influence of humidity then does Mr. Tutt refer ultimately all melanic phenomena, but in trying to prove this, he, to my mind, in the first place, insufficiently discriminates between the two classes of melanism which he has to explain, and further confuses his argument, unintentionally I think, by the introduction of two principles whose exact bearing and character he appears to misunderstand, *heredity* (p. 30 et seq.) and *natural selection* (passim). Now, heredity is strictly only that principle, as to the exact cause of which biologists are by no means agreed, but which compels offspring to resemble parents. If you have a preponderating melanic tendency in the parents the offspring will inherit such tendency, but it is obvious that such a statement and such a principle explain the perpetuation only, not the origin of melanism.

Again, it is of the utmost importance in biological discussion to be quite clear as to the exact meaning of *Natural Selection.*

Natural Selection can never originate, it merely carries into effect, it is the machinery, not the motive power, and, of course, the principle of heredity is included in the term Natural Selection.

Mr. Tutt appears to me again to have obscured his reasoning by using these terms inexactly and unmeaningly.[2] Now, if he had simply stated that among other possible causes of melanism he believed humidity to be the most effective, inasmuch as given a humid enviroment, melanism would for various reasons be of advantage to the species affected by it, that heredity might have afforded the possible initial cumulative variation, and that natural selection was the process by which the end had been achieved. Such a statement would at least have enabled his readers to exactly understand what his theory might be. I believe we owe the want of such lucidity to the fact that his book was built up as it were in successive sections: internal evidence of this and the consequent lack of cohesion and unity are very distinct. Mr. Tutt's own opinion, indeed, seems to have become modified in the course of its expression. Thus, on page 26, reference is made to certain experiments of Mr. Merrifield with *Ennomos autumnaria*, and Mr. Tutt says that he believes the difference in imagines, differently treated as larvæ, to have been "due to the difference of the wet and moist conditions to which the larvæ were subjected." Now this, if it mean anything, means that Mr. Tutt believes dampness to have had some *direct physiological influence* on these larvæ, the inference being that melanism in an imago, might be induced by subjecting its larva to humid conditions.

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[1] "Entomologist's Record," May, 1893.

[2] *e.g.* Answer to Mr. Robson, "Record," No. 5, Vol. IV., page 1, line 20., et seq.

Now I am sure Mr. Tutt never appreciated how wide a chasm separates such a humidity theory as this, from that which it is the whole purpose and burden of his book to explain and justify, a humidity theory of melanism, perfected by natural selection, and such as I have expressed above. But in this explanation of the differentiation of *E. autumnaria* by humidity, it is clear that overboard must go humidity, natural selection, derivative advantage, protective resemblance, every principle except the novel and purely unsupported one, that certain larvæ are compelled by some unknown necessity in their organism, to respond to the physical application of humidity by the production of melanic imagines.

Again, Mr. Tutt at the commencement of his essay (pp. 17-24) expounds very fully and with many admirable instances protective resemblance effected by natural selection (and here the term is very accurately employed) as one of the principal reasons for the existence of melanism; but near the close (p. 60) he sums up thus: "Having now considered this subject from many points, I think we may safely assume that the general cause of melanism is to be sought for in meteorological influence, and that this cause must act in some way *on the larva*."[1] Could anything be more inconsistant? Here we have seven pages devoted to demonstrating how melanism has arisen through the advantage acruing to the imago from assimilative coloration, and eight lines "safely assuming" that melanism has arisen through purely physiological influences brought to bear on the larva.

These are instances of the want of homogeniety in the general course of Mr. Tutt's argument. Now let us see into what a fallacy he has been led by his want of clear discrimmination of the cases under discussion. Let us take what seems to be his earlier and certainly best supported view, viz.: that this humidity acts, in the way most other natural influences act, by natural selection and the survival of the fittest, and that melanism generally is due to such influences.

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[1] The italics are mine.

His thesis then would stand thus:—

Humidity, in the form of fog or rain, precipitates the soot suspended in the air of Lancashire and Cheshire, staining all objects more or less black, assimilative protection comes into play, melanism becomes at once advantageous, and the thing is explained. We grant at once that here is a tenable theory of the melanism of Lancashire and Cheshire granting certain premises, but it is obviously impossible to explain the melanism of Sligo and Shetland, by a theory which demands the constant presence in the air of suspended soot. Still humidity must be the agent, therefore the proposition is thus distorted.—Humidity means clouds, clouds obscure the sun, black owing to greater absorbant power is the best colour for the insect where the sunshine is scanty and often obscured, hence derivative advantage again and the same result. Did it never occur to Mr. Tutt that if humidity meant clouds, and clouds melanism in Donegal and Caithness ever since those localities had any insect population at all, then humidity and consequent clouds fn Lancashire and Yorkshire should have been equally operative since the beginning, without waiting for the adventitious aid of the smoke and fumes of manufactures.

However, ignoring such a difficulty as this, will it do to assume roughly that great humidity and a strong melanic tendency are generally coincident? I think not. Of course the real issue is very much complicated and obscured by the fact, that localities of extreme humidity are generally localities of high elevations as well, and the phenomena may easily be attributed to the wrong factor; but dissociating as far as possible mere elevation from the question, any map showing average rainfall should convince Mr. Tutt that Kerry, Carnarvonshire, and Cumberland are far ahead of Shetland or Orkney as regards humidity, but which of these districts exhibits the most pronounced forms of melanism? I think it would be quite possible to argue that melanism of what I have called the archaic sort, follows lines more of altitude and latitude, than of humidity and longitude. This, of course, is principally a matter of opinion and the detailed examination of evidence. My object is rather to point out some of the instances of confused thought and defective reasoning which occur in Mr. Tutt's book.

His obvious fallacies also require notice. Firstly, I should not have imagined that anyone would have attributed to the Gulf Stream the *humidity* of our climate as Mr. Tutt has done (p. 40 et seq.). The Gulf Stream does not influence the *rain-fall* of this country in the slightest, the *temperature* it does very considerably, the excessive rainfall of our western coasts is due to the fact that they first intercept and condense the prevailing south-westerly winds, laden as they are with aqueous vapour, derived not specially from the Gulf Stream, but from all the tropical Atlantic. This error does not, however, affect his argument, and I quite admit the western half of these islands to be more humid than the eastern.

Another point I refer to as of greater import. Mr. Tutt appears to quite misunderstand the meaning of Professor Weissman's and, I think also of Mr. Merrifield's experiments on the effect of temperature on larvæ and pupæ. Mr. Tutt assumes that these are held to prove that the application of cold induces melanic variation (see p. 24), and he dissents from such a conclusion. They appear to me to do necessarily nothing of the kind.[1] The idea suggested by those experiments seems to be somewhat as follows :—Every form in its normal perfected condition as we know it now, is the result by evolution of a vast series of antecedent forms.—That series we call the phyllogeny of the species—but each individual roughly recapitulates in its own development an abstract of the whole series of that phyllogeny—this we call the outogeny of the individual. Now, the application of cold is supposed to arrest the normal outogenetic development at some penultimate point, and the resultant imago appears in a form more or less approximated to some antecedent stage of the phyllogeny. Thus the pupæ which should have given the butterfly *A. prorsa*, on the application of cold resulted in something much nearer *A. levana*, because *levana* is the antecedent, but the *levana* pupæ could never be made to approximate to *prorsa*, because that form was not included in their outogeny. The inference therefore is, that were melanic forms present recently, in the phyllogenetic series of any species, then it might be possible that the application of cold might arrest development at a point below the present normal, and produce instead such an archaic, melanic form. Such, as briefly as I can express it, seems to be the philosophy of the great German biologist's experiments, but it is evident that is it a mere distortion of their meaning to say, that they seek simply to prove that cold applied to larvæ or pupæ induces melanism in the imagines—it can only induce it if the melanism was there pre-existent in some former stage of the species' development.

I have dwelt on these points at some length, as they illustrate what careful accuracy is necessary in the examination of biological problems. Mr. Tutt's long essay furnishes other examples of the want of this quality on which it would be easy to dilate.

I have purposely refrained from any comment on the opinions expressed by Dr. Chapman, Mr. Cockerell, and others, in the long quotations which Mr. Tutt prints from the letters of these entomologists, as it seems hardly fair to criticize mere selected extracts from private letters, as the settled and deliberate opinions of the writers as to the causes of melanism.

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[1] See "Studies in the Theory of Descent," Dr. Weissman, English edition, 1882.

Reviewing the whole controversy, it appears to me that the most valuable contribution yet made to it has been that of Lord Walsingham. His suggestion as to the derivative advantage gained for the organism, by the assumption of a dark coloration under conditions of decreased or obscured sunlight seems scientifically sound, theoretically adequate, and in part, at least, confirmed by actual experiment and direct experiment in cases of this sort, is of far greater value and importance than mere theorizing or unsupported assertion. One might have anticipated that Mr. Tutt's humidity theory would have been fortified by some experimental evidence however slight. *Xylophasia polyodon* is, I believe, a common insect and comes into the category of affected species. Could not Mr. Tutt have selected a normally light coloured pair of this moth, divided the ova, subjecting either part to such opposite conditions of dryness and humidity as he might consider should be effective, and then announce the result to an expectant world. One such carefully conducted experiment resulting in normally light imagines from the dry larvæ, and moths with *any* distinct trace of melanism from the larvæ fed up in a humid atmosphere, would be worth more from an evidential point of view than the whole of Mr. Tutt's book from title page to colophon. This, however, still remains to be done.

On the other hand, we have Lord Walsingham's actual experiments and the well established laws of physics. To me it appears perfectly credible that during the long ages of semiarctic conditions through which Northern Europe passed, after the maximum refrigeration of the glacial period had been already assuaged, this principle—that of the superiority of a dark surface in the rapid absorbtion of the feeble heat rays of that time—might have been actually operative, and resulted through natural selection, in a great preponderance of melanic forms, and further, I see no objection to believing that our present melanic Alpine, Northern, or Irish forms, may be merely the survivors of such a general archaic melanism.

I must confess, however, that *recent melanism*,the melanism of the smoke clouds, is far more difficult to explain satisfactorily. The suddenness of the change seems so surprising, nothing we know of the ordinary processes of natural selection acts with a rapidity comparable to this. And yet by some form of natural selection must the effect have been produced, unless we assume a direct physiological action, and of this we have no evidence. It is true my late friend, Mr. N. Cooke, of Liverpool, did ascribe to solid carbon assimilated (or more properly absorbed) by the larva, the resultant blackness of pigment in the imago, but, with Mr. Tutt, I should at once dismiss such an idea as contrary to everything we know of the physical process involved in in the case.

My own belief is that we require far more evidence on this class of phenomena than we possess at present. I think the close association of melanism and manufacturing activity has been overstated. My own slight experience would rather lead me to believe that where the fumes and smoke of mines, or mills, or 'works' of any kind are strong enough to have any influence at all, they exterminate rather than 'melanize,' and I think that rather better evidence might be produced for the association of these melanic forms with a peaty soil, with heather, or with woodland darkened by pine or larch, than with the perturbing effect of chemical fumes or coal smoke. Then again, I think we require more exact and contemporaneous evidence as to the change said to be so recent in many of the species under discussion, we want testimony, going back say fifty years, from a score or so of competent observers in as many districts in Great Britain as to the change in such a species as *Amphidasys betularia.* In localities influenced by the products of manufacturers, for this it is probably vain to hope, but there are many points which strike me as never having been adequately discussed in this phenomena of recent melanism, as, for instance, why do the Geometræ seem so especially subject to it? Noctuæ, we know, are very susceptible to melanism of the northern kind; why, then, are not they equally affected by the supposititious inflences of manufacturing agencies? Again, is it not a fact that species, whose habitat is *sylvan*, are the principal sufferers? What influence may the great increase in the planting of pine, larch, and spruce, during the last century have had? It has certainly made our woodlands darker and denser than when they were composed of the more properly indigenous oak, and birch, and beech. Again, we have a mass of evidence of melanism rampant round large towns in Lancashire and Yorkshire.* How far may not this be due to the fact that most entomologists live in towns, and work within easy distance of them, and that there are probably more observant entomologists in the towns of Lancashire and Yorkshire than in any other district (except London) in the Kingdom? These are some of the questions which occur to me, questions, perhaps, more easily asked than answered. At any rate, I feel that the case is very far from being ripe for dogmatic assertion about smoke, clouds, or any other agencies. And again, I would ask why no practical and enterprising entomologist has not made some of these species the subject of direct experiment. Take *A. betularia*, which seems to be one of the clearest and best known cases. As to glacial epochs and post Tertiary faunas we must fain theorize, but here where we have phenomena proceeding under our very eyes, experiment is clearly the road to truth, experiments conducted after the manner of Mr.

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* *Melanism prevails around Newcastle-on-Tyne where there are proportionately very few Entomologists.—Ed.*

Poulton, and with equal care and patience. I apprehend that the type form of *A. betularia* is still obtainable. The progeny of such a pair, then, should be subjected, if necessary and possible, for successive generations, to various influences, heat, cold, humidity, dryness, obscured light, smoked glass, atmospheres adulterated with carbonic acid, the larvæ should be fed on stunted food, smoky or soot besprinked leaves, in short, all the imaginable influences brought to bear on them which the most active fancy might suppose at work in a state of nature modified by civilization.

Possibly this has been done, possibly there may be difficulties in the way of which I am ignorant: perhaps this is a species which will not feed in confinement. However that may be, such a method as this would appear to my ignorance to be all singularly well calculated to elicit valuable results. Without such experiments, and with very insufficient and incomplete evidence as to the exact date of this recent melanic tendency, its rate of increase and spheres of activity, it appears to me that we are as yet hardly safe in coming to any conclusion at all in the matter.

In this, as in all other scientific enquiry, it seems to be most essential for the attainment of what we are supposed all to strive after—the discovery of truth—at all costs, to avoid that high *a priori* road so fascinating and so treacherous, not to formulate a theory first and then search out facts in its support, but rather to make sure of facts first, leaving theories to evolve themselves, or be evolved with deeper and wider experience. Thus is truth ultimately won; no conclusion at all is better than a wrong conclusion, and the progress of human knowledge has been retarded by few things more than the rashness, which, on insufficient evidence, leaps to a preconceived assumption as to a proved certainty.

Lidsham, Cheshire.

ENTOMOLOGICAL NOMENCLATURE.

(*A Reply to Dr. Buckell.*)

BY C. W. DALE, F.E.S.

Dr. Buckell puts me in mind of Van Tromp, the Dutchman, who hoisted a broom at his mast-head, as a sign that he had swept the Englishmen off the seas. He commences by accusing me of an untruth. If he reads the "Young Naturalist," Vol. IX., p. 68, for the year 1888, he will find the statement I have copied. He should also read the following statement by Mr. W. F. Kirby, in the "Entomologist's Monthly Magazine," Vol. VIII., p. 42.—"The twelfth edition of Linnæus' "Systema Naturæ" (1767) is the date fixed by the rules of the British Association for Zoological Nomenclature, and these rules are at present considered binding on Zoologists." Now for more than twenty years this statement has passed unchallenged, and I am now to believe Dr. Buckell in preference to Messrs. Kirby and Robson.* Mr. Kirby also states in the Linnæan Proceedings for 1869 that "to admit the claims of any author previous to the year 1767 would be simply to introduce an element of additional and very serious confusion into our already sufficiently confused synonomy." This will account for what Dr. Buckell calls profound animosity to the works of Dr. Staudinger on my part.

A work I should strongly advise Dr. Buckell to read and study, is the "Philosophia Entomologica" of Fabricius, drawn up on the plan of the "Philosophia Botanica" of Linnæus.

Dr. Buckell accuses me of confounding the Hufnagel of the Berlin Magazine, with the Hœfnàgel of a century earlier. This is hardly worth taking notice of, except to warn Entomologists of the future not to confuse Dr. Buckell with the late Mr. Buckler.

We next come to the *Sinon-Podalirius* question. Here Dr. Buckell says that I misquote Staudinger. Am I the first to raise this question? Mr. Arnold Lewis says: "Dr. Staudinger's miscalculated assault on *Podalirius* has become a joke already" ("Entomological Monthly Magazine," Vol. VIII., p. 4, Note at bottom). But have I misquoted him? It is all very well to have an addenda and corrigenda at the end of a volume, but that is no excuse for a gross error in the first reference on the first page. But Dr. Buckell goes on to say that "After all, Poda, in 1761, was the first to describe the insect." Is this a correct statement? In the footnote on page 463, which Dr. Buckell refers to in the following reference—Ray Insects, III, n. 3. I turn to Ray and find the insect fully described by him. Linnæus refers to Ray's description, and bestows a name upon the insect. Perhaps Dr. Buckell will say he ought to have copied Ray's description instead of only referring to it.

I give Dr. Buckell a word of thanks for correcting the error I fell into in giving *Edusa*, Fab. 1776, as being the insect we know by that name. I have just read the description carefully through, and acknowledge my fault, and am very sorry for my error. But is *Hyale*, L.=*Edusa*, Auct.? Dr. Buckell evidently thinks not, and brings forward Donovan's statement that the insect labelled *Hyale* was undoubtedly the insect we know by that name. I did not refer to Donovan's statement, for I was told years ago by my father, that the Linnæan collection of insects was brought over from Sweden by Dr. Smith, that the ship was pursued by a Swedish man-of-war and fired upon, and that several labels got displaced and were re-adjusted to the wrong insects. It is curious, too, that Linnæus should include *Hyale* in the Fauna Suecica if it does not occur in Scandinavia. As I have stated before, M. Schizen includes *Edusa*, but not *Hyale*, in the Rhopalocera of Norway. Besides, I cannot imagine Linnæus to be such a bad naturalist as to mistake figures of *Edusa* for *Hyale* as Dr. Buckell imagines.

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* I regret to say I am not an authority on this subject, not having had any opportunity for original investigation. The statement referred to was founded on similar passages elsewhere. I have, however, a very strong opinion of the absurdity of basing our nomenclature on that of Linnæus, and yet rejecting his finished work of 1767, for the earlier and less perfect edition of 1758. I cannot see either that we should set aside the collective judgment of the British Association in this matter, on the mere *ipse dixit* of Dr. Staudinger.—J. E. Robson.

What I, and many other naturalists desire, is that nomenclature should be the servant, not the tyrant, of science, and if Dr. Buckell can do more than I can towards attaining that object, I would rather extend to him the right hand of friendship, instead of treating him in the schoolmaster v. schoolboy fashion in which he appears to be treating me.

Glanvilles Wootton, Dorset.

Publications Received.

CATALOGUE OF BRITISH COLEOPTERA, BY D. SHARP AND W. W. FOWLER.—As some ten years have elapsed since the publication of both Dr. Sharp's Catalogue and that of the Rev. A. Matthews and Canon Fowler, a revised edition by the above two eminent authorities will be gladly welcomed by British Coleopterists. In compiling this Catalogue the authors have evidently endeavoured to bring our nomenclature more in accord with that of our continental brethren; and in doing so we may naturally expect to find many changes have been made in the general arrangement, the generic names, and also in the order of species. While not expressing an opinion as to the wisdom or otherwise of these alterations in the British list, we may express the hope that a standard has at last been arrived at, and that future generations of coleopterists will have less to perplex and confuse them in the matter of naming their specimens than at present prevails.

Among other alterations, we notice certain differences in the mode of spelling various names. For instance, *Ceuthorhynchus*, *Otiorhynchus*, and similarly compounded words in the Catalogue under notice are spelt with an additional *r*. *Polydrosus* was always *polydrusus* in Dr. Sharp's Catalogues, and the latter spelling is adopted in the new edition. No doubt both authors have gone carefully into the question of spelling, but, we believe, there is a disagreement among Greek scholars as to the necessity of doubling the *r* in constructing terms from two or more derivatives, and this applies to several generic names of the Curculionidæ. It also appears that Aristotle (Book XXVII.) used a single *r*, as in *Ornithorhynchus*. But it is of little consequence which mode of spelling is adopted, provided we agree to use one only, and this has not hitherto been the case in either the "Entomological Monthly Magazine" or other entomological publications. The printing of the Catalogue is not so good or perfect as we could wish, and the selected types not nearly so neat as those in Canon Fowler's former production, indeed, the latter Catalogue in this respect is by far the best that has yet been issued. In pointing out these alterations and slight defects, which in no wise detract from the merits or usefulness of the present work, we do not wish to disparage the authors' labours in compiling a Catalogue of so great importance to the student, but have much pleasure in commending it to our readers. The index appended to the Catalogue will be found of great advantage.

British Lepidoptera, by Charles G. Barrett, f.e.s.—The first volume of this work, which completes the butterflies is now in the hands of the subscribers, and will certainly take its place among the most important books on British Entomology. It includes an account not only of those species known to occur in Britain, but also of those known or reputed to have occurred, but which are no longer to be found, also of casual visitors and species accidentally introduced, making 89 in all. Besides the description of the species in their various stages, an interesting account is given of their habits, haunts, &c. The variation of each is also treated on at considerable length, and a description of many striking varieties given, with information as to the cabinet in which such specimens are now placed. Where the separation of the species is difficult, the valuable tabulation introduced by the late Mr. Stainton, is given, which renders it easy, even for a beginner, to name his specimens. In one respect only do we feel disappointed in the work. Mr. Barrett does not deal with the vexed question of synonomy. To do this would, no doubt, take a great deal of time, would involve a controversy and might not settle anything. Mr. Barrett expresses doubt whether the changes of names proposed by Dr. Staudinger are "in all cases warranted, whether, in fact, the descriptions really represent the species to which they have been applied." He settles the nomenclature question so far however, that he adopts those names with which we are all familiar as the proper name of the various species, giving those of Staudinger's Catalogue on the authority of that work, not on the authority of the writers to whom Staudinger attributes these names. Probably Mr. Barrett has done wisely in adopting this course, and there is little doubt that the names to which he has given preference will continue to be those used in this country, until some absolute agreement has been arrived at by the Entomologists of different countries. For the most distinct varietal forms he has used names where such are well known, but he has wisely abstained from adding to their number. Altogether the book is a valuable contribution to the literature of the subject, and must find a place on the shelves of all students of Lepidoptera.

Reports of Societies.

CITY OF LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY.

Tuesday, 4th July, 1893.—Exhibits: Mr. Gates, cases and bred imagines of *Psyche radiella*, *Coleophora lineola*, *C. nigricella* and *C. saturatella;* also examples of *Stigmonota internana* and *Pterophorus pentadactylus*. Mr. Clark, two specimens of *Smerinthus tiliæ*, showing the extremes of the pink and green forms, both bred from the same batch of eggs. Mr. Tremayne, bred specimens of *Vanessa polychloros* and *Thera variata*, including a dwarf specimen of the latter. Mr. Battley, living larva of *Timandra amataria*. Mr. Oldham, a specimen of *Plusia moneta* taken at Woodford, and *Abraxas ulmata* from Epping Forest. Mr. Smith, *Halias quercana*, *Angerona prunaria* and *Pericallia syringaria*, all from Epping Forest. Dr. Sequeira, *Papilio machaon* and larvæ of same, also bred specimens of *Vanessa io*.

Coleoptera: Mr. Heasler, *Magdalinus barbicornis*, *Cryptocephalus frontalis* and *Tillus elongatus* ♂, all from Sudbury, Middlesex. Mr. Burrows, a female specimen of *Tillus elongatus* from Billericay. Dr. Buckell then brought forward the rough draft of the list of London Lepidoptera. The list of Rhopalocera was gone through, and several additions given, and a vote of thanks to Dr. Buckell concluded the proceedings.

July 18th, 1893.—Mr. G. B. Morris, of 18, Woburn Place, W.C., was elected a member of the Society. Dr. Buckell presented to the Society's Library a copy of the 1829 edition of Stephens' "British Insects," and also Cuvier's "Animal Kingdom"; the part of the latter relating to the Insecta was revised by Latreille, and embodies his latest ideas on Nomenclature. Exhibits. Dr. Buckell, a batch of ova of *Ennomos angularia*; he also exhibited a batch of ova of *Melanippe fluctuata* as being in many respects typical of Geometrid ova, viz., of an oval shape and scattered in deposition. The ova of *E. angularia*, on the contrary, were cylindrical, tapering slightly both towards base and apex, and were indented at the latter extremity; they were, moreover, deposited in large batches, slightly overlapping one another. Mr. Morris, an example of *M. galatea* from Swanage, having the white marginal spots on all the wings extremely indistinct; also *A. betularia* var. *doubledayaria* from Scarboro' and a ♀ example of *A. paphia* tending towards the *valezina* form, from the New Forest. Mr. Dewey, examples of *D. orion*, and an hermaphrodite specimen of *L. icarus*, from Eastbourne; also a preserved larva of *T. miniosa*. Mr. Riches, two specimens of *S. fagi* from Epping Forest, one of them being an example of the dark var.; he stated that both of these specimens had been taken from young trees. Mr. Lane, series of *S. tiliæ* from North London. Mr. Heasler, a specimen of *L. phragmitidis*, bred from a pupa found on the Barking marshes; also examples of *Harpalus rotundicollis* from the same locality; he stated that the occurrence of this species at Barking was rather unexpected, the locality given by Fowler being the Isle of Wight. Mr. Riches stated that he had bred during the season, a series of *S. ocellatus*, which had spent two winters in the pupa. Dr. Buckell then read the records of Sphingidæ that he had received for the Society's London Fauna List, to which the members present made many interesting additions.—A. U. Battley and J. A. Simes, *Hon. Secs.*

THE SOUTH LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY.

July 13th, 1893.—Chas. G. Barrett, Esq., F.E.S., Vice-President, in the chair. Mr. E. Oldham exhibited specimens of *Macaria liturata, Melanthia albicillata*, and many others, some fine forms *Odonestis potatoria*, and a specimen of *Plusia moneta*, captured at Woodford on the 2nd June; Mr. Adkin remarking that this species appeared to be distributing itself gradually over the country. Mr. South showed a remarkable form of *Triphæna pronuba*, it being the typical *pronuba* on one side, and the variety *innuba* on the other, also a variable series of *Coccyx ochsenheimeriana* and *C. taedella* from Middlesex. Mr. Fenn exhibited long bred series of *Dicranura bifida, Boarmia roboraria* and *Notodonta dictæa*, from Bexley, the New Forest and Deal respectively. Messrs. Adkin, South, Frohawk and Briggs showed very long series of *Pieris brassicæ*, from many parts of England, Scotland and the Isle of Man, &c., for the purpose of showing the variation existing, both in size and markings. Mr. Adkin drawing attention to the manner in which the depth of colour in the tips varied from black to dove-grey. One shown by Mr. South was no larger than an average *Pieris rapæ.* Mr. Frohawk's comprised, amongst others, a number from Harwich, these corresponded to the Southern French type and had no doubt immigrated. Mr. H. Moore showed three specimens of the Harlequin beetle *Acrocinus longimanus*, from Trinidad, &c. Mr. Auld, a fine var. of *Lomaspilis marginata*, from Folkestone. Mr. Step, a number of pupæ of the Bacon Beetle, *Dermestes lardarus*, which he stated were being experimentally tried as bait for fishing when in the larval condition. Mr. Barrett mentioned a curious instance in which a number of lepidopterous larvæ had been found in earthen cells in a book drawer, and were supposed to have been placed there by one of the fossorial Hymenoptera. Mr. West, of Streatham, shewed *Sesia bembeciformis.* Mr. Turner, two varieties of *Argynnis selene*, and a number of Tortrices and Tinea, including *Penthina pruniana, Sciaphila subjectana, S. hybridana, Tortrix ministrana, Phoxopteryx mitterbachneriana, Nemophora swammerdamiella*, &c. Mr. Briggs also exhibited a portion of the outer covering of a tree wasp's nest, which was curiously striped with blue, the insect having no doubt been using blue paper or other material of that colour in its formation.—H. Williams, *Hon. Secretary.*

VARIETY BREEDING.

BY W. H. TUGWELL.

Whilst my brothers of the net have been ranging the field, wood, and fen, in active pursuit of their Entomological game during the splendid weather of the marvellous summer, nnfortunately for myself, I have been confined to the lonely sick chamber, through a severe attack of lumbar neuritis. Yet, thanks to the charms of rearing larva from the egg, I have still been enabled to get some most interesting experiences amongst my breeding cages. Last year I fortunately obtained, thanks to my friend Mr. Harrison of Barnsley, a few ova of *Arctia lubricipeda* var. *radiata*, Curtis: both ♂ and ♀ parents being from true *radiata* type and every one I bred this year came true to heredity, varying in intensity, still all *radiata* type. The extraordinary weather of April saw all up and a pairing gave me ova, which duly hatched and fed up in May and early June, and by July the 8th imagines appeared again in my cages, and up to date, July 18th, several grand examples have emerged. All again are true to type. Three or four are almost black, only three small intercellular streaks being cream colour. The under-wing entirely black, relieved only by the fine yellow lines of the nerves of the wing and with black fringes; truly grand vars. A great point of interest is the remarkable manner in which the offspring have followed the variation of the parents, and does it not indicate that heredity is the great factor in producing local races. Side by side with this small brood of *radiata*, I had several hundred pupæ reared last year from ova of selected Yorkshire parents, but of a totally different style of variation, in these latter the character was to form a strong central fascia of the Noctua pattern and from my many pupa of this form, I have bred, indeed, a grand series. These vary down to normal southern type but the picked forms are a wonderful lot, but totally differing from *radiata*. I selected one of the strongest marked banded form ♀, and this was paired with a *radiata* ♂. The larva from this cross are now feeding, and I shall watch with much interest the emergence of these imagines to see if there is any blending of the two distinct forms.

Besides the vars. of *lubricipeda*, through the kindness of my friend, Mr. C. Fenn, I had the pleasure of breeding some grand varieties of *P. monacha*. These are part of the brood that Mr. Fenn has been *in-breeding and by selection*, hoping to obtain an entirely black form, and that, I expect he has done, as from my small series, some are almost so, in fact, you might well call them black.

6, Lewisham Road, Greenwich.

SUGARING.

As numbers of the forms for recording the results of "Sugaring" have come to hand, it becomes necessary that I must lay some of the details before my readers. Had the problem been one that proved easy of solution, it might have been well, only to print such items as were necessary to explain the solution. But as this has not been so, as, in fact, only negative results can be shown so far, the better way will be to publish a selection of the reports. This, therefore, I proceed to do, prefacing them by two of earlier date which have marked peculiarities.

SPARHAM, NORFOLK.—September 1st to 10th, 1878.

Garden and paddock; bright moonlight; treacle spread on apple and oak. Results: plenty of *Xanthographa*, *Meticulosa*, *Saucia*, *Litura*, *Protea*, *Suffusa*, *Segetum*, &c., &c. *Glariosa* 1.—Frank Norgate, Bury St. Edmunds.

SANDY, BEDFORDSHIRE.—October 5th to 11th, 1878.

Garden; during six consecutive nights of bright moonlight, some fine, calm, some rainy or very strong wind, moths came in abundance to sugar and rum spread on apple trunks, most of which were within three feet of a very extensive mass of ivy in full bloom, on which were six ladders to enable us to search it, but the sugar was the great attraction every night, whether bright moonlight or rain, calm or wind. Results: *Semibrunnea*, 1 at ivy, 14 at sugar, and many more were taken at this sugar after I left Sandy on the 12th. *Lota*, *Oxyacanthæ*, *Cubicularis*, *Meticulosa*, &c., &c., were numerous, and one *Nupta*. Frank Norgate, Bury St. Edmunds.

LONDON, S.W.—March 15th, 1893.

Wood; wind, N.E., very light; sky, clear; atmosphere, very damp, a thick white fog. Sallows just coming out, a few insects at them. *Progemmaria*, *Fagella*, &c., very abundant; some at sugar, but as they occurred at every tree trunk, their presence at the sugar may have been accidental. Results: swarms of *C. vaccinii* and *S. satelletia*, a few *T. stabilis* and *cruda*, one *C. flavicornis*. E. H. Taylor, Fulham.

Two reports for 28th March and 3rd April from Mr. S. L. Mosley, Huddersfield, were printed on p. 125. From this time forward sugaring was absolutely without results. Four reports from the North of Scotland were given on p. 124, from 5th to 11th May, q.v. I resume the reports from that date, showing how other parts of the country were affected.

NEWBURY, BERKSHIRE.—15th May, 1893.

Oak wood, undergrowth just cut; wind, E., very still; sky, cloudy, after thunder showers. Sugared on trees with treacle, rum, and jargonelle essence. Honey dew actually dropping from maple and sycamore leaves. Results: *A. exclamationis* 2. (Miss) Mary Kimber, Cope Hall, Newbury.

ELGIN, MORAYSHIRE.—18th May, 1893.

Wood of fir, oak and birch; wind, W., light; sky, obscured; atmosphere, damp and very warm. Geometers were flying abundantly especially *Remutata* which was in hundreds. I also got *Bidentata*, *Liturata*, *Ferrugata*, *Exanthemata*, *Pusaria*, *Vulgata*, and one *Falcula*. Not a single moth appeared at sugar. Arthur Horne, Aberdeen.

Warrington.—18th May, 1893.

Lane near woods; wind, S.W., steady; sky, quite obscured; atmosphere, wet, showery; a storm came on when going to the place, another when I was brushing on the sugar, and again when going round. I lit up at 9.40 a.m. and left off at 10.15, raining hard all the time. Results: *A. rumicis* 3, *psi* 4, *H. adusta* 17, *oleracea* 5, *M. brassicæ* 3, *A. segetum* 1, *T. gothica* 2, *N. plecta* 4, *A. unanimis* 1. Jos. Collins, Warrington.

Burghead, Morayshire.—22nd May, 1893.

Sand-hills; wind, W., very light; sky, cloudy, showery in afternoon but dry in the evening, occasional peals of thunder. Captured *Piniaria*, *Pumilata*, *Nanata*, *Resinana*, *Coniferana*, &c., in an adjoining fir plantation. Sugar was entirely blank. A. Horne, Aberdeen.

Bay of Nigg, Kincardineshire.—23rd May, 1893.

Coast; wind, S., fair breeze; sky, cloudy; atmosphere, dry. Found 1 *Conspersa* at rest and captured another, but they were not flying generally. Results: *Myricæ* 3, *Adusta* 21, *Pisi* 1, *Exclamationis* 1, *Plecta* 1. A. Horne, Aberdeen.

Newbury, Berkshire.—23rd May, 1893.

Oak wood, undergrowth cut this year; wind, W., fresh; sky, clear, bright moonlight; heavy showers in afternoon. Results: *A. rumicis* 1, *N. festiva* 1, *exclamationis* 9. (Miss) Mary Kimber, Cope Hall.

Derncleugh Moor, Aberdeenshire.—24th May, 1893.

Wind, W., almost calm; sky, obscured; atmosphere, dry until 11 p.m. when a light shower fell. Took 2 *Menyanthidis* and 2 *Myricæ* at rest on the palings before sugaring, and netted a few *Impluviata* among alders. Results: *Menyanthidis* 8, *Myricæ* 1, *Tenebrosa* 1. A. Horne, Aberdeen.

Derncleugh Moor, Aberdeenshire.—24th May, 1893.

Particulars as above. Sugared about 100 posts. *Menyanthidis* commenced to fly about 11, and was still on the wing when I left at 12.30. The rain became very heavy about 12 and I had to leave sooner than I should otherwise have done. Results: *Menyanthidis* 8, *Myricæ* 3, *Lucipara* 1. Wm. Reid, Pitcaple.

Woodstock, Oxford.—24th May, 1893.

Meadow and side of wood; wind, N., very light; moon, obscured by heavy clouds; atmosphere, dry. Sugared about a dozen trees, common sugar boiled with beer and a little rum. Results: *A. exclamationis* 2, *G. libatrix* 1. J. H. D. Beales, Kiddington Rectory.

Wimbleton Common.—24th May, 1893.

Wood-side; wind, N.N.W., light; sky, fairly clear; moonlight; rather heavy dew. Geometræ very abundant, flying freely in the moonlight. A few common Noctuæ (*Rurea*, *Basilinea*, &c.,) netted. Results: *G. libatrix* 2. The only insect at the sugar. E. H. Taylor, Fulham.

PITSCURRIE MOOR, ABERDEENSHIRE.—25th May, 1893.

Wind, N.W., slight, very cold; sky, partly obscured; bright moon; dry. Sugared about 100 posts, found a pair of *Menyanthidis* on the posts in cop. Results: *Menyanthidis* 4, *Myricæ* 1, *Adusta* 1. W. Reid, Pitcaple.

BANKS OF THE AVON AT DALNASHAUGH, BANFFSHIRE.—25th May, 1893.

Wind, W., slight; sky, obscured; dry. Found 2 *Glauca* at rest, Netted 2 *Duplaris*, 1 *Batis*, 1 *Plecta*, *Bidentata*, *Pendularia*, *Propugnata*, *Helveticata*, *Minutata*, *Montanata*, *Silaceata*, *Ferrugata*, *Impluviata*, *Exanthemaria*, *Cratægata*, *and* 1 *Lacertula.* Results at Sugar: *Leporina*, var. *Bradyporina* 1, *Lucipara* 1. Arthur Horne, Aberdeen.

NEWBURY, BERKSHIRE.—25th May, 1893.

Oak wood with aspen and birch, one year's growth of underwood; wind, W.; bright moonlight; dry; thermometer 53°. Results: 1 *Exclamationis.* (Miss) Mary Kimber, Cope Hall.

DERNCLEUGH MOOR, ABERDEENSHIRE.—26th May, 1893.

Wind, N., moderate; sky, obscured; dry. Got 1 *Menyanthidis*, 1 *Glauca*, several *Satyrata* var. *callunaria*, and *Impluviata*, at rest on palings before sugaring. Geometers were flying freely in a fir wood on the moor, but sugar was entirely blank. Arthur Horne, Aberdeen.

SUNDERLAND, DURHAM. 26th May, 1893.

Sea banks; wind, W.; sky, obscured; atmosphere, slightly damp; temperature 54° Fahr. Sugared posts, thistles and other flowers. What moths were taken was on the first round, 9.45—10.10. Not one after. Noticed *H. lupulinus* flying in numbers before dusk, and *M. fluctuata* on nettle flowers after dark. Sugar results: *H. adusta* 1, *oleracea* 4, *A. basilinea* 5, *N. plecta* 3, *A. segetum* 1. L. S. Brady, Sunderland.

WARRINGTON.—26th May, 1893.

Lane near woods; wind N.W., gentle breeze; sky, obscured; dry with no mist, and not very warm. Results: *A. psi* 2, *rumicis* 2, *H. oleracea* 4, *adusta* 1, *P. lucipara* 1, *A. putris* 1, *N. plecta* 2. Jos. Collins.

NEWBURY, BERKSHIRE.—26th May, 1893.

Oak wood, undergrowth cut this year; Wind N.W.; moonlight, rather hazy; very dry. Honey dew appearing again. Result: *P. meticulosa* 1, *G. trilinea* 1, *A. exclamationis* 1. (Miss) Mary Kimber, Cope Hall.

BAY OF NIGG, KINCARDINESHIRE.—27th May, 1893.

Coast; wind, S., light; sky, obscured; fair until midnight when it began to rain. At dusk I netted 4 *Conspersa*, 1 *Gothica* and 1 *Dubitalis*. Sugar results *Adusta* 44, *Myricæ* 2, *Oleracea* 1, *Pisi* 1, *Tenebrosa* 1, *M. brassicæ* 1. A. Horne, Aberdeen.

LONDON, S.W.—28th May, 1893.

Wood; wind N.N.E., light; sky, clear. Plenty of insects about though not at sugar. Results: *H. thalassina* 1, *A. nebulosa* 1. E. H. Taylor, Fulham, S.W.

PITCAPLE, ABERDEEN.—1st June, 1893.

Mountains, wind N., slight, sky, obscured, heavy mist, cold enough to make the teeth rattle, not an insect on the wing, and nothing came to sugar. Wm. Reid, Pitcaple.

MARLBOROUGH, WILTSHIRE.—1st June, 1893.

Wood of young oak, birch, &c., with undergrowth; wind, N., scarcely perceptable; sky, slightly cloudy at first then clear. Results: *A. psi*, *G. trilinea* 7, *A. exclamationis* 1, *N. festiva* 2, *A. nebulosa* 1, *H. dentina* 1. H. S. May, Marlborough.

QUANTARNESS, ORKNEY.—2nd June, 1893.

Moorland; wind E., light, sky cloudy, dry. Captured *Atomaria*, *Nanata*, *Pumilata*, *Satyrata*, was common and varied greatly but I found nothing approaching the Shetland *Curzoni*. *Ciliella* was abundant and very variable, 1 *Cespitalis*, 1 *Schultziana*, *Ericetella* abundant. Light attracted some of the natives but no moths. Sugar results, *Adusta* 2, *Dentina* 11, *Glauca* 1, very dark.—A. Horne, Aberdeen.

PITCAPLE, ABERDEENSHIRE.—2nd June, 1893.

Mountains; wind E., very slight, sky clear, becoming obscured, dry at first, then frosty mist. A beautiful day followed by a heavy frosty dew and dense cold mist, not an insect on the wing. Sugar result nil.—Wm. Reid, Pitcaple.

WARRINGTON.—2nd June, 1893.

A line of Ash trees skirting an osier bed; wind W., very slight, sky threatening rain. Plenty of *Geometers* flying, and on the street lamps when returning. Sugar spread at 8.45, went round at 10. Result, *Psi* 1, *Fasciuncula* 15, *Pisi* 1, *Oleracea* 2. I saw one *Thalassina* on a tree trunk before I spread the mixture, but the species did not put in an appearance afterwards.—Jos. Collins, Warrington.

MURTLE, ABERDEENSHIRE.—3rd June, 1893.

Mixed wood with undergrowth of bilbery and ling; wind S., light and warm, sky obscured, wet in afternoon with thunder, dry after 6 p.m., a little foggy. Found 1 *Coryli*, 3 *Menyanthidis*, 1 *Rectilinea* and several *Satyrata* at rest on tree trunks, common *Geoemtræ* such as

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TO CORRESPONDENTS.

This part contains a plate in illustration of the Hand Book of British Spiders.

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Cratægata, *Bidentata*, *Ferrugata*, &c., were flying abundantly in the wood at dusk. Sugar results: *Menyanthidis* 1, *Rectilinea* 7, *Adusta* 1, *Tenebrosa* 2, *Batis* 1. I went over the sugar three times beginning at 10.30 p.m. On the last round at 11.45 only *Batis* turned up. Jos. Collins, Warrington.

SUNDERLAND.—3rd June, 1893.

Sea banks; wind W., very slight; sky obscured, damp; temperature 55°. What would be called an ideal night for sugar. Had been showery with thunder during the day, rained slightly at intervals at night, and was very dark. Noticed *H. humuli* at dusk, but no *Lupulinus* which swarmed three days ago. Took ♀ *Adusta* off a gas lamp at 11.30. Sugar results: *H. adusta* 1, *thalassina* 1, *pisi* 2, *oleracea* 5, *N. plecta* 4, *M. fasciuncula* 2, *R. tenebrosa* 7, *A. segetum* 2, *X. rurea* 5, *A. basilinea* 6. L. S. Brady, Sunderland.

WARRINGTON.—3rd June, 1893.

Lane near woods. A dead calm, wet and raining in the afternoon, turning to a thick heavy mist which hung low on the ground, sky fairly clear above. A failure from want of wind to carry off the mist, and which would also have diffused the smell of the mixture. Only four species came to sugar, viz.: *H. oleracea* 2, *thalassina* 1, *X. rurea* 1, *A. basilinea* 1. Jos. Collins, Warrington.

WOODSTOCK, OXFORD.—3rd June, 1893.

Edge of wood bordering stream; wind S., very light. There had been no rain for some days until this evening, when it fell from 6 to 7.30, remaining very damp and misty till 10, when it became clearer. Temperature at 9, 57°. No noctuæ seen and very few geometræ except *M. montanata*. Sugar results: nil. J. H. D. Beales, Woodstock.

WARRINGTON.—4th June, 1893.

Lane near woods; wind W., slight; sky clear, a little dappled with clouds. Many moths flying, I noticed *Fasciuncula* on the wing at 8.45, and plenty of common Geometers. Went round the trees at 10 and 10.45. No new arrivals at second round. Results: *M. fasciuncula* 20, *strigilis* 4, *A. basilinea* 12, *unanimis* 1, *H. oleracea* 40, *thalassina* 4, *suasa* 2, *pisi* 1, *adusta* 8, *M. anceps* 1, *brassicæ* 10, *A. segetum* 2, *exclamationis* 3, *P. lucipara* 1, *A. psi* 1, *megacephala* 1, *N. festiva* 1. Jos. Collins, Warrington.

PITCAPLE, ABERDEENSHIRE.—6th June, 1893.

Wood and mountain near moor; wind S. or S.S.E.; sky obscured, very warm and damp. Sugared over 200 fir trees, my brother also sugared at the same place, and our total catch was *Rectilinea* 2, *Adusta* 1, *Tenebrosa* 1. I saw one *Rectilinea* whilst spreading the sweets, common Geometræ and Micros were abundant. Wm. Reid, Pitcaple.

WOODSTOCK, OXFORD.—6th June, 1893.

Edge of wood bordering stream; wind S., very light; sky cloudy, rain threatened during afternoon; temperature 61°. Insects well on the wing at 9.15, but nothing came to sugar. I imagine that the abundance of honey-dew may be the cause of this absolute failure, as there appear to be numbers of Noctuæ about, most of which came to light. J. H. D. Beales, Woodstock.

CASTLE ÇARY, SOMERSET.—6th June, 1893.

Edge of corn field; Wind N.E., slight; dry. At sugar nothing, but I took the following at flowers of bladder campion *(Silene inflata)* *L. pallens* 1, *A. putris* 2, *X. rurea* 2, *lithoxylea* 2, *polyodon* 6, *N. saponaria* 1, *M. anceps* 1, *A. basilinea* 3, *exclamationis* 1, *N. plecta* 2, *D capsincola* 6, *carpophaga* 2, *H. serena* 1, *A. advena* 12, *C. umbratica* 4, *P. chrysitis* 3, *iota* 2, *gamma* 1, *E. venosata* 7, *S. olivalis* common, *G. melonella* 1, *A. sociella* 1, *C. pratellus*, *culmellus*, *P. monodactyla*, *A. pentadactyla*, all common. Wm. Macmillan, Castle Cary.

MURTLE, ABERDEENSHIRE.—6th June, 1893.

Wood; no wind; sky obscured; foggy, with frequent showers. I found 2 *Menyanthidis*, 1 *Adusta*, and 1 *Rurea*, var. *combusta* at rest. Geometers were not flying in such numbers as on 3rd. I netted a few *Hectus*, nearly all the undernoted came to sugar on trees along a footpath in the thickest part of the wood. Out-standing trees on moor were almost blank. Sugar results: *Rectilinea* 10, *Adusta* 6, *Pisi* 1, *C-nigrum* 2, *Tenebrosa* 7, *Menyanthidis* 1. A. Horne, Aberdeen.

LONDON, S.W.—7th June, 1893.

Wood; wind E.S.E., slight; sky clear, but misty; temperature rather low. Geometræ fairly abundant just before dusk. Sugar results: *D. pinastri* 2, *A. nebulosa* 3. E. W. Taylor, Fulham.

MUCHALLS, KINCARDINESHIRE.—9th June, 1893.

Coast; wind S.E., light; sky partly obscured; dry, but heavy dew. We only saw one *Conspersa* at Silene, apparently it was not a suitable night as we did not find anything at rest. Sugar produced *Tenebrosa* 8, *Adusta* 5, *Oleracea*, *Myricæ* and *Lucipara* one each. Wm. Reid, Pitcaple.

SUNDERLAND, DURHAM.—12th June, 1893.

Sea banks, Hendon; wind E., light; sky slightly cloudy; temperature 50°. Sugar spread on posts, thistles, and umbelliferous flowers. Only three or four moths were taken off posts and thistles, the bulk being on the sugared umbellifera; 10.15 to 11.30 was the most productive time, only one or two appeared after that. Results: *N. c-nigrum* 20, *festiva* 5, *plecta* 3, *M. brassicæ* 2, *H. adusta* 7, *X. rurea* 30, *A. basilinea* 30, *H. pisi* 3, *oleraeea* 8, *M. fasciuncula* 2. Everything very fine. L. S. Brady, Sunderland.

ROTHERHAM, YORKSHIRE.—14th June, 1893.

Road near wood; wind N., but barely discernable; sky clear; a little ground dew. I do not remember taking much with a North wind at any time, and generally stay at home. On this occasion I noticed odd specimens of *M. montanata*, *A. ulmata*, and *R. cratægata*, which were the only insects seen. I sugared about 30 trees at 8.40, visited and re-visited them till 10.45, but no insect of any description came to the sugar. Wm. Brooks, Rotherham.

MARLBOROUGH.—14th June, 1893.

Wood; wind N.E., very mild; sky clear; dry. There had been a thunder shower at mid-day. A fair number of insects were on the wing but only the following came to sugar at about 9.30: *A. ligustri* 2, *C. duplaris* 1, *M. strigilis* 3, *N. festiva* 2, *L. comma* 1, *G. trilinea* 2, *A. exclamationis* 4, *H. oleracea* 1. H. S. May, Marlborough.

WICKEN FEN.—14th June, 1893.

Fen and lane adjoining; wind N. and N.E.; almost absolutely dark; fen perfectly and absolutely dry; warm. Sugared on trees, reeds tied in knots, and low plants. Insects came freely to light in the fen this night, and included 10 *N. cilialis*, *H. cribralis* commonly, *C. phragmitellus* abundantly, 1 *C. mucronellus*, 1 *H. unca*, &c. Results at sugar: *A. advena* 6, *ravida* 1 (not usually seen at Wicken until July), *L. pudorina* 12 (just out, and every specimen perfect in freshness), *M. anceps*, a few *T. derasa*, 1 *B. repandata*, 1 *H. oleracea*, *L. pallens*, *N. plecta*, *A. segetum*, *exclamationis*, *M. fasciuncula*, *strigilis*, *A. gemina*, and *N. c-nigrum*, all very abundant. Geo. T. Porritt, Huddersfield.

LONDON, S.W.—14th June, 1893.

Wood; wind E., very light; cloudy at first, clear later; dry; the *fringe* of a thunder storm fell just before dusk. The evening was very close and warm, still and motionless, and to all appearance a perfect night for sugar. Geometræ and Noctuæ were abundant but not a single insect came to sugar. The honey-dew is very thick on everything. I believe sugar will be of no use until we have some heavy rains. E. H. Taylor, London.

It is worth notice that on this evening, sugar was successful at Wicken, but not in the other three places from which I have records. The absolute failure at places so widely remote as Rotherham and London is certainly worth noticing in connection with Mr. Porritt's success at Wicken. The records for the succeeding evenings must also be observed. Wicken appears to have been the only place where sugar was at all productive.

DERNCLEUGH, ABERDEEN.—15th June, 1893.

Wood; no wind; sky clear, but foggy and frosty. Found two *Rectilinea* at rest, and netted one *Rurea*. Sugar results: *Rectilinea* 2, *Adusta* 1. Wm. Reid and A. Horne, Aberdeen.

WICKEN FEN.—15th and 16th, June, 1893.

Fen and adjoining lane; wind E.; starry and not dark, but cold and the fen quite wet. Scarcely anything came to light this evening and very few Geometræ were on the wing. At sugar the same species came as on the 14th, but in much smaller numbers, except *A. advena*, of which six or eight occurred each night, and *Pudorina* which should have been even more numerous as they were coming out fast. G. T. Porritt, Huddersfield.

ABERDEEN.—16th June, 1893.

Wood; wind W.; sky cloudy; dry and very warm. Found one *Menyanthidis* at rest. Sugar produced *Exclamationis* 1, *Tenetrosa* 3, *Fasciuncula* 1. A. Horne, Aberdeen.

SUNDERLAND.—16th June, 1893.

Sea banks; wind W., scarcely any; sky clear; rather damp air; temperature 64° Fah. The only apparent reason for comparitive failure to-night was the clear sky (see notes for June 12th) when wind was east, but sky cloudy. Sugar results: *N. festiva* 3, *C-ingrum* 3, *plecta* 1, *H. oleracea* 6, *pisi* 3, *adusta* 2, *A. basilinea* 6, *X. rurea* 6, *R. tenebrosa* 2, *M. fasciuncula* 50, *M. brassicæ* 1, *A. segetum* 2. There were immense numbers of *humuli*, *lupulinus*, and *montanata* flying at dusk, and many Noctuæ, but the latter did not turn up at sugar in proportion to the numbers that appeared to be on the wing earlier. L. S. Brady, Sunderland.

WOODSTOCK, OXON.—16th June, 1893.

Side of wood, bordering stream; wind S.E., very slight; starlight, a slight shower yesterday. Intensely close, thermometer at 9.17 was 69°. Numbers of insects about, principally Geometers. Sugared trees, mostly willows, but not a single insect of any kind came to the sugar. J. H. D. Beales, Kiddington Rectory, Woodstock.

WICKEN.—17th June, 1893.

Fen and and adjoining lane; wind N.E.; sky black, dark; very warm and fen perfectly dry. Moths abundant at light, including about a score *N. cilialis*, 2 *M arundinis*, 2 *Amataria*, hosts of *E. apiciaria*, *C. pragmitellus*, *H. cribralis*, and a few *A. immutata*. At sugar *A. advena*, and *L. pudorina* were plentiful, and all the species taken on the 14th occurred. G. T. Porritt, Huddersfield.

MARLBOROUGH, WILTS.—17th June, 1893.

Wood; wind W., mild; sky clear, dry. At sugar *A. ligustri* 1, *exclamationis* 2, *nebulosa* 1. H. S. May, Marlborough.

ABERDEEN.—19th June, 1893.

Wood; wind N.W., gentle breeze; sky cloudy, dry. I netted *Porphyrea*, *Plecta*, *Velleda*, *Repandata*, *Liturata*, *Lariciata*, *Satyrata*, *Ocellata*, *Cæsiata*, *Immanata*, &c. Geometers were flying abundantly in the open part of the wood. At sugar: *Tenebrosa* 3, *Fasciuncula*, red form, 1. A. Horne, Aberdeen.

WICKEN.—19th June, 1893.

Fen and adjoining lane; wind E., scarcely so dark and colder. *A. advena* and *L. pudorina* came commonly to sugar, but most other species were in fewer numbers. I got 2 *A. ravida* this night, and netted a fine ♀ *C. ligniperda* flying about the sugared trees. Geo. T. Porritt, Huddersfield.

SUNDERLAND.—20th June, 1893.

Sea banks; wind E., but very light, sky cloudy; temperature about 54° Fahr. At sugared flowers: *N. c-nigrum* 9, *plecta* 6, *festiva* 2, *exclamationis* 2, *H. adusta* 2, *pisi* 6, *oleracea* 6 (these three worn), *A. basilinea* about 30, *X. rurea* about 12, *M. fasciuncula* about 30, *R. tenebrosa* 1. L. S. Brady, Sunderland.

HARTLEPOOL.—20th June, 1893.

Sand hills and railway embankment; wind E., slight; sky clear, dry. I sugared about 30 posts with the following results: *N. c-nigrum* 1, *A. fasciuneula* 1, *X. polyodon* 1. On flowers of Hieracleum at the same place, I found the following species, all of which were very abundant except when I give a number: *L. comma* 1, *conigera* 1, *lithargyrea*, *A. cubicularis*, *morpheus* 1, *T. orbona*, *pronuba*, *X. polyodon* 3 or 4, *rurea* 1, *M. fasciuncula*, grey forms in hundreds, red forms 3, *H. oleracea*, *adusta* 1, worn, *pisi* 1, *A. segetum*, *exclamationis*, *A. basilinea*, *N. plecta*, *C-nigrum*, *festiva* 10, *augur* a few. John E. Robson, Hartlepool.

I have previously commented on the results of these two reports, and have no doubt that Mr. Brady's insects went to the flowers quite independent of the sugar he had spread on them. The localities in a direct line are only some 20 miles apart, and of a very similar character.

ROTHERHAM.—20th June, 1893.

Woolly wood and railway fences; wind N., slight; sky obscured, but very dry. Sugar was put on about 40 trees and posts, the mixture was black treacle, honey, and rum. Stayed till 11 p.m. without seeing a single insect on any of the patches of sugar. Took on the wing *Pulchrina* 2, *Rurea* 3, *Basilinea* 3, and a few plumes and pugs. Several *A. ulmata*, and *M. montanata* were on the wing. W. Brooks, Rotherham.

WICKEN.—20th June, 1893.

An old orchard near the fen. A similar night to last, and moths very abundant. *A. advena* and *L. pudorina* more numerous than ever. Geo. T. Porritt, Huddersfield.

LOCH NABO, MORAYSHIRE.—20th June, 1893.

On the banks of the Loch; wind W., very slight; sky obscured, dry. My sugar was spread on the trees by the foot-path round the loch, Geometers were flying abundantly, especially *Repandata*, I also netted *Tenebrosa* which did not come to the sugar, the only species there being *Polyodon* 10, *Lucipara* 1, *Oleracea* 5, *Pallens* 1, *Gemina* 4. A. Horne, Aberdeen.

Wicken.—21st June, 1893.

The first rainy night. Sugared in the garden of the house we stayed at. Moths came abundantly to the sugar, *A. advena* being plentiful on trees within three yards of the house. Geo. T. Porritt, Huddersfield.

London, N.—21st June, 1893.

Wood; wind S.W., light; sky very thinly obscured at first, clearing later. Dry in the evening, but there had been a few drops of rain during the day, which had been cool and overcast. Insects were not plentiful. At sugar I took *R. tenebrosa* 1, *X. rurea* 2, *hepatica* 1, *T. pronuba* 1, *A. basilinea* 1, *M. strigilis*, var. *æthiops* 6, *A. exclamationis* 1, *N. augur* 4, *festiva* 2, *A. nebulosa* 6. F. J. Buckell, London.

Marlborough.—22nd June, 1893.

Wood; wind W., moderate; sky slightly cloudy; rain fell after 10. Taken at sugar about 9.30 p.m.: *A. ligustis* 4, *psi* 1, *C. derasa* 1, *L. pallens* 2, *A. advena* 2, *herbida* 1, *nebulosa* 2, *X. polyodon* 1, *C. cubicularis* 1, *M. strigilis* 1, *A. exclamationis* 4. H. S. May, Marlborough.

Hunstanton.—22nd June, 1893.

Sugared palings near the coast. A cold wild north-east wind with a little rain. Only about a score of moths came and they of the commonest description; not a single specially coast species appeared. G. T. Porritt, Huddersfield.

Marlborough.—24th June, 1893.

Wood; wind W.N.W., not strong; sky clear, dry. At sugar: *C. derasa* 1, *duplaris* 1, *A. exclamationis* 5, *segetum* 1, *M. strigilis* 3, *M. anceps* 2, *L. pallens* 4, *A. basilinea* 1, *N. augur* 1. H. S. May, Marlborough.

Hartlepool.—27th June, 1893.

Sand hills; wind W., rather strong; sky cloudy, heavy rain had fallen during the day. At flowers of Hieracleum which were so attractive on June 20th. I saw nothing but *Fasciuncula*, which were very abundant. I sugared some recently erected posts which were strong of creosote, on these there was nothing but *Fasciuncula*. At the other posts I saw or took *M. fasciuncula*, hundreds of the grey form, two only of the red form; *L. pallens* 1, *comma* 2, *lithargyria* 6, *A. basilinea* 8 or 10, *X. polyodon* 3, *A. ravida* 1, *N. c-nigrum* 3, *festiva* 20 or 30, *augur* 4. John E. Robson, Hartlepool.

MARLBOROUGH.—28th June, 1893.

Wood; wind W., strong; sky cloudy, but dry; moonlight. There had been a shower or two in the morning. At sugar: *T. batis* 1, *A. ligustri* 7, *nebulosa* 1, *X. polyodon* 2, *lithoxylea* 2, *M. anceps* 1, *N. augur* 2, *festiva* 1, and many specimens of *L. pallens*, *A. exclamationis*, and *M. strigilis*. H. S. May, Marlborough.

LONDON, DALSTON, N.E.—28th June, 1893.

Larks wood, Hale End (a small wood); wind W., strong; sky clear at the time, changeful during day, somewhat damp after heavy showers. Sugared oak exclusively in sheltered places. Moon at full, but not high enough to penetrate the shadows of a wood. Results: *T. batis* 5, *derasa* 4, *X. hepatica* (worn) 2, *lithoxylea* 1, *T. pronuba* 1, *N. augur* 4, *A. exclamationis* 1, *M. strigilis* a few (worn), *C. affinis* 2. The only other Noctua observed was *C. trapezina* 1, taken on wing. Poor though this list is, the recent rains (or some other cause) have wrought a great improvement as sugaring at Hale End had hitherto been a complete blank, the best record I have heard being 1 *pronuba* and 2 *strigilis*. Louis B. Prout, Dalston.

MARLBOROUGH.—29th June, 1893.

Wood; wind S.W.; sky clear and dry at first, damp cold mist later. At sugar: *A. exclamationis* 5, *segetum* 1, *T. pronuba* 3, *X. polyodon* 2, *lithoxylea* 1, *M. anceps* 1, *C. derasa* 1, *A. ligustri* 2, *basilinea* 2, *E. lucipara* 1. The following evening the only insects that came were *L. lithargyria* 4, *X. polyodon* 1, *lithoxylea* 1, and *A. advena* 1. H. S. May, Marlborough.

I cannot spare space for further reports in this issue. A large number of those who agreed to record their observations have not sent in their returns for lack of anything to report. I will resume the publication of these reports in next month's magazine, and will be glad if observers will continue their observations during the autumn. May I again say that negative results may help our quest quite as much as successful records.—ED. B.N.

THE GENUS SILPHA, Linné.

BY REV. W. F. JOHNSON, M.A., F.E.S., AND G. A. LEWCOCK.

(Continued from page 134.)

7. *S. atrata*, L., and its varieties (*brunnea*, Herbst., and *subrotundata*, Steph.) are the representatives of the last division of this group. The type form of *S. atrata* differs from *S. lævigata* in being rather smaller in size, and in having long and comparatively slender antennæ, the

last three joints of which form a distinct club. The beetle is oblong oval in shape, nearly double as long as broad, of deep black and shiny; thorax dull, except in centre, and thickly punctured all over; elytra parallel-sided for two-thirds of their length, then rounded to apex, concave margin not broad, interstices rugosely punctured. Length 10—15 mm. *S. atrata* is generally distributed over the British Isles, but is commoner in inland places. It can be taken freely by ditch sides, in May and June, in vegetable refuse, under bark of willows, &c., at roots of trees, in moss, rotten wood, and sometimes at carcases. We have no authentic record of its capture in Ireland, the whole of the Irish specimens which have come under our notice being undoubtedly *subrotundata*.

Var. *brunnea* resembles the type-form in structure and general appearance, but the average specimens are smaller and more oblong in shape, the colour being reddish-brown instead of black. It is said to occur chiefly in high districts, but is also found in company with *S. atrata* in other places. It is much commoner in Orkney than the type-form; the specimens exhibited being from that locality. Canon Fowler is inclined to consider var. *brunnea* as an immature or not quite developed form of *atrata* ("Entomologist's Monthly Magazine," Vol. IV., p. 144), and, judging from the South of England specimens, which are all more or less translucent, this may possibly be so: but the Orkney insects are well developed and show rather a deficiency of colouring matter than any signs of immaturity. Mr. W. E. Sharp obtains the beetle in Wales, but not specially at high elevations. Mr. A. J. Chitty captured one in the New Forest, and another at Leatherhead. Also taken by Mr. Hall at Watford; and under willow bark at Kingston-on-Thames (G.A.L.).

Var. *subrotundata* as a rule is larger than *S. atrata*, although very fine specimens of the latter, quite equal in size to *subrotundata*, are occasionally met with. The beetle is broader in proportion to its length, giving it a rounder appearance; instead of its being uniformly punctured all over, the disc of the thorax is less thickly punctured than the margins; the elytra are broadest at about the middle, instead of being parallel-sided, and the concave margin is very strongly and broadly developed at the shoulders, and is continued more nearly to the apex than in *S. atrata*. It is generally stated that the central raised line on the elytra is the longest, but from a close examination of a great number of specimens (about 70 of which are exhibited) we do not find this to be the case, so that this characteristic cannot be relied on as a distinguishing feature. The colour varies from a reddish-brown to deep black. Length 11—15 mm.* The beetle is found commonly in Ireland, but we have no authentic record of its capture in any other portion of the British Isles.*

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* The largest exhibited specimen of *S. atrata* measured as near 15 mm. as possible.—G.A.L.

Our correspondent, Mr. W. E. Sharp of Ledsham, who takes great interest in this subject, has kindly written us on this variety as follows :—" *Subrotundata* seems to me to be a form of specific and not only varietal divergence. It differs from the type, and also no less from the var. *brunnea*, in general size, colour, shape, punctation of thorax, and sculpture of thorax and elytra; *e.g.* the convex margins of both are much broader. So far I can find no authentic instance of any capture except in Ireland and the Isle of Man. Canon Fowler himself throws doubt on Reitter's record of Scotland, and I myself believe that the various records from Devonshire, South Wales, &c., really refer to var. *brunnea*. This, of course, is only an opinion. What we want is further information on the following points :—

a. Is there any absolute record of *S. subrotundata* from England or Scotland ?

b. Is there any record from any other locality in the palearctic zone ?

c. If not, what is the nearest exotic form ?

To these questions I have so far been unable to find satisfactory answers. There seems to be an error in distinguishing between this var. and the type by the difference in the length of the ribs of the elytra, as all vary individually, and both type and so-called variety vary about the same."

In concluding this paper, we beg to thank Mr. Sharp, with whose opinion respecting *subrotundata* we rather agree; and also Messrs. Chaney, Chitty, Newbery, and other correspondents who have kindly assisted us with information as to the occurrence, &c., from their own experience, of the species comprised in the Genus Silpha.

MR. DALE ON "ENTOMOLOGICAL NOMENCLATURE."

(" British Naturalist," July, 1893, pp. 142–146.)

BY DR. BUCKELL.

Mr. Dale's second paper is unfortunately marred by the same characteristics as his former one.

Leach's name *Gonepteryx* for *rhamni*, which is undoubtedly the prior one, but which has never obtained currency save in this country, was deliberately rejected by Boisduval on account of its too great similarity to *Gonoptera* which had been established by Latreille for a noctua. Boisduval's *Rhodocera* is met with first, not in the "Histoire Naturelle des Insectes" of 1836, the date given by Mr. Dale, but in a work on North American Lepidoptera published three years earlier. Again Mr. Dale is wrong about Westwood, the name used by that author in 1839 being *Goniapteryx*.

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* Fowler states that *S. rotundata* has been recorded from Glanvilles Wootton, Devonshire, and South Wales. As we do not know on whose authority these records were made, we have omitted them, as requiring further confirmation.—G.A.L. and W.F.J.

Coming now to *Papilio*, Fabricius was not, as suggested by Mr. Dale, the first to limit its application as a generic name to the Swallow-tailed Butterflies, Latreille had already done so in the "Hist. Nat. des Crustacés et des Insectes," published in 1805, two years before the abstract of Fabricius' "Systema Glossatorum" was published in Illiger's Magazine. The date of Dalman's *Amaryssus* is also wrongly given, it should be 1816.

With regard to the *Lycænidæ*, Mr. Dale is in error in stating that Latreille limited the name *Polyommatus* to the Blues; like Schrank's *Cupido* it included all the *Lycænidæ*, and, if Mr. Dale rules the latter inadmissible he must, to be logical, apply the same treatment to the former. The name is first used twelve years earlier than the date Mr. Dale gives, and in the work mentioned above, in which the species are set down in full. In the work of the date specified by Mr. Dale (1817) which is the first edition of Cuvier's Animal Kingdom, the species are not detailed. Latreille says therein that the distinctive character of the Lepidoptera to which he applies the generic name *Polyommatus* is the possession of little eyes on their wings, that the most common of them in the environs of Paris is *P. alexis*, and refers his readers for the other indigenous species to the "Nouv. Dict. d' Hist. Nat." tom. 17, p. 79. Turning to this work which was published in 1803, I find at the page indicated a list of the Linnæan Pap. plebeii. In the "Encyclopédie Méthodique" 1823, the name is still used for the whole family. Hubner was the first, in his "Verzeichniss" of 1816, to separate the Blues from the Coppers, and he divided the Blues into eleven genera, five of which contain British species. Hubner's work, however, was very little known and his generic names for the Blues have never come into use. Subsequent authors have shown much confusion in the application of the two names *Lycæna* and *Polyommatus*, as the following summary will show: Horsfield 1828-9, Stephens 1829, Curtis 1829, and Westwood 1840, use *Lycæna* for the Coppers and *Polyommatus* for the Blues. Duponchel 1844, Lederer 1852, Herrich-Schæffer 1855, Rambur 1858, H. Doubleday 1859 (second edition), Newman 1871, Staudinger 1871, use *Polyommatus* for the Coppers and *Lycæna* for the Blues. Kirby in his Supplement, 1877, uses *Lycæna* for Coppers and *Plebeius* for Blues. Edward Doubleday in "The Genera of Diurnal Lepidoptera" and A. G. Butler in his "Catalogue of Insects described by Fabricius" 1869, use *Lycæna* for Blues and *Chrysophanus* for Coppers. Henry Doubleday 1850 (first edition), Stephens in his British Museum Catalogue 1850, Westwood 1855, and Stainton 1857, use *Polyommatus* for Blues and *Chrysophanus* for Coppers. Boisduval 1833 uses *Polyommatus* for Coppers and *Argus* for Blues. The balance of authority is seen from this summary to be rather in favour of the use of *Lycæna* for the Blues.

Mr. Dale's next assertion that *argus* L. is our common blue certainly entitles him to be included in the ranks of what Mr. Robson once called the "resurrection-men." I am not at present in a position to offer an opinion as to whether Mr. Dale is right but would call attention to one or two points bearing on the question. Mr. Dale relies again on Linnæus' references, but he will find that both Donovan in relation to *hyale*, Curtis in relation to *camilla (sibylla)*, Stephens in relation to *mæra*, *ligea*, *sibilla*, *populi* and *maturna*, and Westwood, make pointed reference to the lack of agreement between the descriptions and the references of the great naturalist. It is certain that, while there has been considerable difference of opinion as to whether *argus* L. was the same insect as *ægon* W.V., only a few of the very earliest authors, among them Mr. Dale's bète noir Hufnagel, held the opinion entertained by Mr. Dale.

With regard to *minimus* Fuessl., Mr. Dale says that Fabricius rejected the name on account of its absurdity. Of this there is not a particle of evidence; Fabricius was describing an insect in Schiffermuller's Cabinet and he used the name which was there given to it. He gives *minimus* as a synonym, but attributes it to Esper, and shows no sign of any acquaintance with Fuessli's work. It must be remembered that the "law of priority" was not formulated at that time.

Mr. Dale next deals with the *agestis* puzzle. He says that Esper adopted the name of *medon* from Hufnagel "thus carrying that name back to 1776." Mr. Dale should have said to 1766. The *medon* of Esper may be the *medon* of Hufnagel, but Esper's type figure is not our insect, the latter he figures later as *medon var.* Does Mr. Dale really wish the case settled by the "law of priority"; if so, *alexis* Scop., is the name that must be selected, but I do not agree with him for I think it would be unwise to transfer a name by which one common insect has been widely known to another common insect which has been widely known by two other names.

In the case of *ægon* Mr. Dale has again fallen into the error of not consulting Staudinger's addenda; had he done so he would have found that Staudinger there replaces *ægon* and therefore that South *has* followed Staudinger.

Mr. Dale next says that Hubner in 1776 figured a butterfly under the name of *Papilio medea*. This could not be, as the earliest of Hubner's works is dated 1785. Then Mr. Dale represents Staudinger as rejecting *medea* for the reason "that the *medea* of the Vienna

Catalogue and of Fabricius was another butterfly" and goes on to say "Here I fail to follow him." Staudinger certainly does not say that the *medea* of the Vienna Catalogue and the *medea* of Fabricius were the same insect. He says exactly the contrary. He does say that Fabricius named the insect *blandina* which he saw in Schiffermuller's Cabinet under the name of *medea*, because he had himself used *medea* for another butterfly in 1775. Staudinger refuses priority to *medea* on the ground, which should commend itself to Mr. Dale, (see his first paper,) that that name is not, in the Vienna Catalogue, associated with any description.

Next Mr. Dale finds fault with Staudinger for using *Satyrus* as a generic name for *semele* and says *Hipparchia* is the right name to use. Mr. Dale attributes the name *Satyrus* to Boisduval in 1840, but its genesis was due to Latreille thirty years earlier. The division of what we now know as the Satyrids into genera was, comparatively speaking, a late affair. Schrank in 1801 used *Maniola* for the whole, Fabricius in 1807 made the same application of *Hipparchia*, and it is curious to notice, in view of Mr. Dale's claim that this is the correct generic name for *semele*, that that species is not mentioned among the representative species which alone are given by Illiger. Latreille in "Considérations Générales" 1810, first uses *Satyrus* and gives *teucer* as the typical species; in the "Encyclopédie Méthodique" the name is used for the whole group which is divided into eight lettered sections of which our British species occupy the last. Evidently, therefore, it is no more correctly applied to *megæra* than to *semele*, notwithstanding Mr. Dale's curious reason derived from the French vernacular name. Dalman in 1816 used *Erebia* for the whole group, but he specifies *ligea* as the type species, so that the present limited use of this generic name is justified. Hubner in the "Verzeichniss," divided the Satyrids into nine families and thirty-seven genera, British species being found in four of the families and ten of the genera; *semele* with three other species received *Eumenides* as a generic name, and this is the earliest name it received as differentiated from other Satyrids. Lederer was the next, in 1852, to differentiate *semele* from *janira* and *tithonus*, and he adopts *Satyrus* as the generic name for it, and Herrich-Schæffer 1856, Rambur 1858, and Newman 1871, do the same, so that Staudinger has authorities to back him.

Then Mr. Dale attempts to make *comma*, L., the same as *linea*, W.V. Here, however, the diagnosis he quotes contains the refutation of his theory in the words "punctis albis." Has Mr. Dale ever seen a *linea* with white spots? Are not the white spots of the underside the characteristic mark of *comma?* Here again it would appear that Linnæus' descriptions are more to be relied on than his references.

Canonbury Square, July 29th, 1893.

Reports of Societies.

CITY OF LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY.

August 1st, 1893.—Exhibits: Dr. Buckell, a copy of the original edition of Doubleday's "List of British Lepidoptera," published in 1850; the List was kindly lent to him by Mr. John E. Robson. Mr. Smith, examples of *Macroglossa fuciformis* and *M. bombyliformis* from the New Forest. Mr. Gates, series of *Batrachaedra præangusta*, *Dictyopteryx contaminana* and *Halonota brunnichiana*, from Hammersmith. Dr. Sequeira, series of *Iodis vernaria*, *Nemoria viridata* and *Pseudoterpna cytisaria* from the New Forest; also dwarf forms of *Thecla betulæ*, *Notodonta ziczac*, *Dicranura furcula*, *Amphipyra pyramidea* and *Catocala sponsa*, from various localities (mostly bred). Mr. Nicholson, an abnormally large ♀ specimen of *Ocneria dispar*, bred this season; also very fine var. of *Smerinthus tiliæ* which had been bred from a larva taken at Clapton; the insect was of the reddish form but had no signs of the central band. Mr. Riches, a fine batch of full fed larvæ of *Smerinthus tiliæ*, and also examples of the pitcher-shaped leaves of the Side-saddle flower (*Sarracenia*) and specimens of both flowers and leaves of the Pitcher plant (*Nepenthes*). Mr. Riches expressed his doubts as to the reported carnivorous propensities of this genus; but upon reference we find that these were established many years ago by Sir J. D. Hooker, who in his address to the British Association at the Belfast Meeting in 1874, recorded many experiments shewing that the acid juice secreted at the base of the 'pitchers' is capable of killing insects and digesting meat and other soluble nitrogenous matter. Mr. Battley exhibited a long series of *Zygæna trifolii* from Broxbourne; the variation ranging from the type through nearly all possible intermediates to the var. *conflua*. Capt. Thompson read some very interesting notes on his exhibit, which consisted of a fine series of *Tapinostola elymi* bred from pupæ obtained by Miss Inchbald and Mr. P. Inchbald, F.L.S., also pupa cases of this species *in situ*. Mr. Heasler, a strange var. of *Philonthus splendidulus* taken at Beckenham; the curious point about the insect being the absence of the dorsal series of punctures on each side of the thorax, which are so characteristic of the species of this genus.

August 15th, 1893.—Exhibits: Mr. Oldham, a series of the males of *Odonestis potatoria*, varying from dark brown to yellow, some being paler than the ordinary females; also *Triphæna fimbria*, *T. orbona*, and *Cosmia affinis*, from Woodford. He also brought some ova of *Strenia clathrata* for distribution. Mr. Nicholson, a bred series of *Thecla betulæ* from Epping Forest. He remarked upon the large preponderance of females in this species. Mr. Clark, *Triphæna fimbria*, *Lycæna ægon*, *L. argiolus*, *Cerostoma radiatella*, and *Crambus adipellus*, all from the New Forest. Mr. Battley, living larvæ of *Polyommatus phlæas*. Dr. Buckell, larvæ and pupæ of *Euthemonia russula*. He stated that a few larvæ out of a brood of this species had fed up rapidly and passed into pupa, but the remainder appeared to be about to hibernate. He also exhibited a series of *Agrotis puta* from Freshwater. Mr. Bloomfield, a specimen *Gonepteryx rhamni* from the New Forest, intermediate in colour between the two sexes. Mr. Gates, *Arctia mendica*, *Hecatera serena*, *Tanagra chærophyllata*, *Pterophorus trigonodactylus*, *Cemiostoma laburnella*, *Lithocolletis tristrigella*, *Argyresthia gœdartella*, &c., all from Shepherds Bush. Mr. Bacot, a bred series of *Vanessa polychloros* from the New Forest. Mr. Huckett, a bred series of *Ennomos angularia*. He remarked that these had begun to emerge from the pupa during June. Mr. Southey, a bred series of *Cerura vinula*.

Coleoptera: Mr. Heasler, *Oodes helopoiodes* and *Pæderus riparius*, both from Hanwell. Mr. Clark stated that while sugaring in the New Forest he noticed a hornet pounce down upon a wasp, and after a long struggle, kill and eat it. He also remarked upon the large numbers of these two insects this season. Mr. Huckett stated that some larvæ of *Arctia caja*, reared from the egg, were already spinning up. Mr. Southey reported that *Hepialus sylvinus* was common on Hampstead Heath, but that the usual Noctuæ appeared to be very scarce. Mr. Bloomfield gave an account of an excursion to Wicken Fen on August 5th. *Nonagria despecta*, *N. hellmanni*, and *Apamea fibrosa* being some of the best insects observed. The larvæ of *Papilia machaon* were scarce and very small, the greater part being only just out of the egg.—A. U. BATTLEY and J. A. SIMES, *Hon. Secs.*

THE SOUTH LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY.

July 27th, 1893.—J. Jenner Weir, Esq., F.L.S., F.Z.S., F.E.S., President, in the chair. Mr. A. Robinson exhibited a magnificent series of *Callimorpha hera*, bred from ova obtained from a female captured in Devonshire, in August, 1892. He mentioned that among those he bred, a large number were deformed in the hind wings, and principally in the left one. Mr. Robinson also had two specimens of *Dicranura bicuspis*, from Tilgate Forest, one being a very light variety. Mr. Turner exhibited a fine series of *Pempelia palumbella*, from Oxshott, also a few *Thera variata*, one being almost unicolorous, and *T. firmata*, &c. Mr. Dennis brought a box of *Thecla betulæ*, bred at the end of June, one having the orange band somewhat smaller than usual. Mr. R. Adkin exhibited specimens of *Smerinthus populi*, from Lewisham, the New Forest, and Sutherlandshire, for comparison, three of those shown being of that very light brownish form that occasionally occurs, one from each of the localities named; also a few *Smerinthus ocellatus*, bred from larvæ found at Lewisham. Mr. Barrett exhibited the larvæ belonging to the *Diurnea* group, referred to by him at the last meeting, and made some comments thereon. These larvæ, if not actually still alive, were in a state of very fresh preservation, and Mr. Weir said he thought there was hardly any doubt about their having been stored by one of the Mason Wasps, as food for its young. Mr. H. Williams exhibited five pupæ of *Lencophasia sinapis*, for the purpose of showing the gradual development of the perfect insect, one of which emerged during the course of the evening. The average dates were, ova laid 26th May, hatched 6th June, the first pupating on the 9th July. Mr. Step exhibited the following species of galls from Epsom, viz.: *Audricus fecundatrix*, *Neuroterus lenticularis*, *Andricus astreus*, *Cynips kollari*, *Rhodites nervosus*, *R, rosæ*, and *R. eglanterex*. Mr. Step expatiated upon the advantages of studying the Phytophagous Hymenoptera, and a discussion ensued, in which Messrs. Step, Barrett, Weir, and others took part.

August 10th, 1893.—J. Jenner Weir, Esq., F.L.S., F.E.S., President, in the chair. Mr. Weir exhibited some cases which had been found under a Sycamore, by a neighbour of his, Mr. Tolhurst, at Beckenham, Kent. He said attention had been called to these cases by seeing them hopping over a gravel path, a power which they retained for some days after they were obtained. The cases were circular disks about 13 mm in diameter, and had been made from the upper cuticle of the leaf, forming one side, and silk the other. Upon examining the leaves of the tree, the round spots from which the cases were partly formed were plainly visible and also the large blots from which the larvæ had eaten the parenchyma. It was at first thought that they might be the cases of a *Tischeira*, but they did not agree with any of the species found in this country, and they had since been identified by Mr. McLachlan as the work of a Saw-fly, *Phyllostoma aceris*, Kalt. The President also exhibited nearly adult larvæ of *Hemerophila abruptaria*, and drew attention to the fact that two pairs of prolegs were as usual in geometers fully developed, and that there were also two other imperfect pairs in front of these, he considered these very imperfect prolegs to be vestigial. Mr. Frohawk exhibited specimens of *Macroglossa* *bombyliformis*, together with a species of Humble-bee which it mimics, taken in company over Rhododendrons in the New Forest on 21st May last. Mr. R. Adkin exhibited a specimen of *Sesia cynipiformis*, in which the usual red colour of the band of the left fore-wing and a portion of the costal streak was replaced by yellow; also a series of *Spilosoma lubricipeda*, reared from Barnsley parents, in some of which the spots showed a tendency to become elongated. Mr. Oldham exhibited series of *Sphinx ligustri*, *Apamea ophiogramma*, *Cosmia affinis* and other species, taken at Woodford.—H. Williams, *Hon. Secretary*.

General Notes.

The derivation of Bellargus.—I hear that Mr. Tutt in his "Record" finds fault with me for deriving *bell* (bellargus) from the French word bellè. He derives it from the Latin *bellus*. May I ask why he derives it from *bellus* more than from *bellaus*? As Argus was the guardian of Juno he was more likely to be warlike than beautiful. If, on the other hand, he applies Argus as Geoffroy did to the spotted butterflies, if he uses *argus* with a French and not a Latin meaning, it is not unreasonable to derive *bell* also from a French word. (Here may I give Mr. Tutt the information that there is also a Latin adverb *belle). Bellargus*, in any case, is bad or dog-latin, therefore nonsense. Bellus argus or rather Argus bellus, or Argus bellaus is good or classical latin.—C. W. Dale.

Doubleday's List, 1st Edition.—Dr. Buckell has called my attention to a curious fact connected with this list. The three last names on p. 15 are reproduced on p. 17, and the 72 species in the third column of p. 15 and on p. 16 are also reproduced on p. 17 et seq., but in a considerably modified arrangement, and with many differences in the generic names. The work appears to have been published in sheets of 8 pages, which are marked pp. 1 to 8, A, 9 to 16, B, 17 to 24, C, 25, 6 and 7, D, the lettering being in the lower right hand corner of the first page of the sheet. Dr. Buckell suggests as the publication commenced in 1847, and the title page is dated 1850, that an interval elapsed between the issue of the different sheets, and that the author had seen reason to modify his views between the issue of the second sheet (B) and third (C) where this repetition and alteration takes place. The paper too, of A and B, differs slightly from that of C and D. The title page, dated 1850, is of the same paper as C and D, and was doubtless issued with the latter sheet which otherwise only contains 3 pages. It may be, however, that there were two issues of this edition, the second differing though not called a Second Edition, and that my copy contains part of each. Can any one explain? I do not remember the matter having been noticed before.—John E. Robson, Hartlepool.

The Yellow-billed Sheath-bill *(Chionis alba)* in Ireland.—A specimen of this bird was shot by Mr. Richard Hamilton, Carlingford, Co. Down, on December 2nd, 1892, a detailed account of which, along with a full description of the bird, and an excellent plate, are given in the June part of the "Irish Naturalist," from which the following particulars are taken. "*Chienis alba* lives like our Oyster catcher, singly or small flocks, on the shores of Antarctic islands; it feeds on mollusca, carrion, seaweed and eggs." It "inhabits the coast of Patagonia, the Falkland Islands and South Georgia"; "Darwin and other voyagers remark the great distances from land at which the bird is to be met with in the open ocean, and, according to Prof. Newton, the most northerly record is latitude 44° S., 260 miles off the coast of Patagonia, which is very remarkable for a wadle; 44° S. lat. is also about the northern limit of drift ice, which the Sheath-bill is said to frequent." The writer argues at great length on the possibility of the bird having wandered far from its usual haunts, wandering still further, in its endeavour to seek a climate similar to that of its native home. He also argues that it is not a bird likely to be brought home by sailors. It would certainly be very interesting, if it could be established that the bird had so visited the Irish coast, but though the facts appear to point in that direction, actual proof is not likely to be obtained.

Saturnia carpini two years in pupa.—From the *Carpini* pupæ I had I have only reared three insects, I thought the others were dead, but on opening one of the cocoons last week I found the pupa was alive. Do they often lay over to another year?—H. T. Robson, Stockton-on-Tees.

My brother sent me a supply of these pupæ bred from larvæ found on the Cleveland Moors. Part of them were sent out to India, but from those I retained not one moth emerged. I expect they are all alive but I have not opened the cocoons. I do not know what others may have experienced, but I never had this pupa lie over before.—John E. Robson, Hartlepool.

The Early Season.—Early appearance of insects other than Lepidoptera. April 6th, *Limnobia punitata* and *Tipula vittata*. April 22nd, *Bibio marci*, *Tipula vernalis*, *Phalacrocera replicata*, *Agrion rubellum*, and *Libellina depressa*. April 28th, *Andrena fasciata*, *fulva* and other spring bees out at Hastings; also *Tipula fascipennis* and *Limnobia morio*. May 3rd, *Bibio venosus*, *Agriotybus armetus*; 5th, *Bibio hortulanus*; 6th, *Bibio punctum-album*; 11th, *Tipula nubeculosus*, *Prosopus pictipes*, *Megachile centuncularis*; 13th, *Hylotoma enodis*, *Pœcilostoma submuticum*, *Prosopis confusa*; 18th, *Eumenes coarctata*, *Isopogon cinctus*; 19th, *Hylotoma ustulala*; 20th, *Lyda inanita*, *Callomyia speciosa*; 24th, *Tephrites cardui*.—C. W. Dale, Glanvilles Wootton.

THE EARLY SEASON.—*Leucophasia sinapis* and *Euclidia glyphica* were both on the wing on 2nd May. I went down to Burning Cliff on 26th May and saw both *Satyrus janira* and *Hesperia actæon* flying, and several of the summer tortrices. *Argynnis paphia* and *Theela quercus* were both out on 16th June.—C. W. DALE, Glanvilles Wootton.

THE EARLY SEASON.—Everything is wonderfully early this season. *Davus* was out first week in June, accompanied by *Russula*. *Sericea* appeared first on July 2nd, while *Imbutata* was then well on the wing, as also were *Turfosalis*, *Warringtonellus*, *Margaritellus*, *Aurovaria*, *Schultziana*, *Pinicolana*, &c., &c. Larvæ, too, are much in advance of former years. I found *Ziczac* and *Tiliaria* full grown on July 2nd, when I also saw half grown *Vinula* and *S. populi*, and one of *Menyanthidis*.—JOS. COLLINS, Warrington.

THE SALLOW FLOWERING A SECOND TIME.—On the 5th of this month (August) I saw two species of sallow, and both sexes, in bloom near Enfield.—F. MILTON, Stamford Hill, N.

MACROGLOSSA STELLATARUM IN SOMERSET.—A sister-in-law of mine recently sent me three specimens of *M. stellatarum* which she took in their garden at White Ball, Wellington, Somerset.—F. MILTON, Stamford Hill, N.

THE PRESENT SUMMER CONCHOLOGICALLY is far from satisfactory, in this district at least, and I expect others have not been much better. Land mollusks of all kinds I have found most difficult to procure, the occasional showers we have has failed to bring them out, probably through the moisture not having reached their underground retreats. I have been trying to make up some sets of slugs, but have not succeeded, as these creatures are far from abundant—no complaints on this point from gardeners, who appear to do very well without them. The usual haunts of the snails too are almost deserted. With aquatic species, ponds and small streams are unproductive, even if they are not quite dried up. The case is different with the rivers, here the dry weather is an advantage to the collector, enabling him to reach the cosy retreats in the bed, where mollusks do love to congregate.

Every conchologist must have remarked how much the localities in his district vary from year to year as to the species found in them, and more especially as to the relative abundance of these, yet I do not recollect having seen any notes on this subject. I have made two visits lately to a part of the Trent which I explored in 1883, at a time when the water was low, as at present; on the former occasion I procured *Anodon cygneus* 20, *A. anatina* 130, *Unis pictorum* 100, *U. tumidus* 70; at the present time *U. tumidus* is the most abundant species of all, and *A. cygneus* far in excess of typical *anatina*. At the mouth of a stream running into the Trent, last year I procured

Bythinia leachii in extraordinary abundance, only a few *B. tentaculata* being found with them, this year I find more *B. tentaculata* and very few *B. leachii*. On a mud bank of the same stream I got last year large numbers of *Limnæa truncatula*, on visiting the place lately I found the mud thickly covered with *Limnæa*, so I hung over the bank and commenced gathering them, never doubting that I was getting *truncatula* as of old, but on closer examination I found I had nothing but young *L. peregra*! W. A. Gain.—Tuxford.

RANDOM NOTES ON BRITISH LEPIDOPTERA.

BY JOHN E. ROBSON, F.E.S.

Gelechia figulella, Staud., in England.

The July part of the "Entomologist's Monthly Magazine" (p. 158), contains a brief notice by Mr. C. G. Barrett, F.E.S., of the capture of *Gelechia (Bryotopha) figulella*, Staud., at Aldeburgh, Suffolk. "It was captured on waste land or salt marshes near the sea, on the coast of Aldeburgh, between July 6th and 20th, 1892," by the Rev. C. T. Cruttwell. Staudinger found it at Chiclana, Spain. Mr. Stainton bred it from a larva and pupæ found in sand at the roots of some plants of *Silene nicæensis* in a sandy wood near the sea at Cannes, and Lord Walsingham has since taken a fine series from Mr. Stainton's locality. It is not supposed to feed on the plant at whose roots Mr. Stainton found the larva and pupæ, but rather on some species of grass. The plant in question does not occur in Britain.

A COLEOPTERIST'S HOLIDAY AMONG THE HILLS.

BY W. E. SHARP.

> "Ille terrarum mehi præter omnes Angulus ridit."
>
> Hor. Car. II., 6

In the north-west corner of this land of England there extends right away from the heart of the Midlands to the frontier line of Wales, the vast flat plain of the sandstones of the Trias, like a sea spreading to the shore of dark Silurian hills, which form its western boundary. Climb that escarpment, penetrate those recesses, and you find an upland region of hills and tumultuous moorland stretching far into the interior of Wales. Such elevations we will call the *hills* of that country as distinct from its *mountains*—those loftier summits which cluster in the north-west round the central mass of Snowdon.

The tract we speak of is in shape roughly triangular; on two sides the valley of the sacred stream of the two fountains describes it; on the third, a vast and level strath sweeps down northward to the sea. None of its elevations exceed some two thousand feet, and such peaks rise up from the brown sea of heather which swells for mile after mile around their flanks, often dimly crowned by the rude entrenchments of forgotten races.

The region is principally composed of the older Cambrian rocks, but we also find, overlying such formations, detached masses of the mountain limestone which, where they occur, completely alter the physiology of the hills. Among those solitudes you may walk for a long summer's day and your feet never leave the heather, and you shall hear no sound save the cackle of the whirring grouse and the wail of the distant curlew.

To such a spot did a kind fate lead the Coleopterist when the mounting sun had but newly entered Aries. And not without hope of memorable captures did we arrive at that sequestered valley. Was there not to explore—first, the river itself, with its beds of shingle and boulder-strewn banks; then the woods, thick and mossy, that clothed the lower valley slopes; then the upland furze-clad stretches, and finally the highest peaks and a vast wilderness of heather?

The spring had been an exceptionally dry one, and the river, as we crossed it in the early morning, rippled very low among its pebbles, The hoar-frost lay white where the shadow of the hills fell, but a steady south-east wind spoke of a cloudless day and a hot noon.

Our first attack is made upon the river bank, where the shingle lies much exposed owing to the low river, and here we should probably, were the season advanced another month or two, take *Perileptus areolatus*, flying in the sunshine. This small beetle, once supposed to inhabit in Wales only the shingle beds of the Conway and Llugwy, has been, of recent years, taken on most of the clear streams of the district. Under stones by the margin of the river we have taken here in May at least five species of *Bembidium*, viz.: *B. atrocœruleum*, *B. tibiale*, *B. decorum*, *B. monticola*, and *B. punctulatum*. For these species, however, we are as yet too early, but we find that graceful beetle *Anchomenus angusticollis* in profusion, and a 'Staph,' not uncommon under these stones, conspicuous by its bright scarlet elytra, proves to be *Philonthus fulvipes*. Where the ebbing water has left banks of dry sand, now warming under the steady sunshine, a bright steely flash of wings and sudden drop tells of the familiar *Cicindela campestris*. Of course *Anchomenus albipes* is abundant everywhere here; but, besides a few common *Pterostichi* and some *Homalotæ*, carefully bottled for future investigation, there is little else under these stones. Let us turn then for a moment to the river birds, they at least are characteristic. No swallow as yet skims the great salmon pool above the bridge, but the grey wagtails *(M. boarula)* flit from stone to stone and run along the shallows, and on some rock jutting from the mid-stream you catch sight of the Dipper *(C. aquaticus)* and watch him skim along level with the water round the bend. In quieter reaches lower down, where the stream lingers between beds of reeds, we may watch the little grebe and the furtive water-hen. Indeed we might easily spend the whole day by this river's side and follow it as it winds, 'a foiled circuitous wanderer' among the wooded hills—

> "For twenty miles where the black crow flies five."

But not thus shall we secure a bottle full of Coleoptera representative of the hills; therefore, turning aside from this rock-strewn river bed, we mount a steep rough lane, whose high banks are studded thickly with the first fair April flowers—celandine, violet, primrose. Half buried in the grass on these banks, lie great stones, and beneath them we recognise the common *Quedius tristis* and *Q. molochinus.* Also abundantly *Calathus cisteloides* and *C. flavipes.* A pair of the red-winged *Staphylinus stercoriarious*, however, is a capture better worth noting. There was also a sullen *Cychrus rostratus*—a beetle which has a curious faculty of creaking when handled. The lane twisted up the side of one of the gorges which break down from the hills into the main valley and quickly led us up into a wood. The trees are mostly larches, just now delicately coloured with the pink blossom and budding emerald needles. Lower down, the sombre spruces make the wood like night, but here through the thin larches the sun streams brightly. Angular blocks of stone, thick with moss, encumber the ground, engrailed now with wood sorrel, as later on it will be with the oak and the beech fern. A bright copper looking 'Staph,' rather common under these stones, is *Philonthus decorus* and we also note here the blue *Carabus catenulatus.* The bark of a decaying log next claims our attention, and we find beneath it, much to our surprise, a couple of *Silphæ* which certainly look like the brown Irish form of *atrata.* Had this proved to be so the discovery would have been most interesting, as so far the form *subrotundata* seems to be restricted to Ireland and the Isle of Man. Careful comparison at home however brought out the points of distinction, and we must refer these brown Silphæ perhaps most accurately to the variety called *brunnea.* This differs from *subrotundata* in being smaller, of a lighter brown colour, and in shape and sculpture of thorax and elytra similar to the ordinary black type. Of this variety two specimens were found beneath another log within a few yards of the first. A far commoner and more properly necrophagous *Silpha* was beaten in vast abundance out of a dead sheep fallen apparently headlong into this wood from the rocks above. This was *Silpha rugosa* and with it were many of

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BRITISH MUSEUM NATURAL HIST

ADVERTISEMENTS.

EXCHANGE.

Duplicates—Blandina, Batis, Rumicis, Impura, Arcuosa, Oculea, Cerago, Chi, Macilenta, Olivata, Rubiginata, Russata, Immanata, Pyraliata, Fulvata, Testata, Prunata, Bisetata, Albulata, Aversata, Montanata, Solandrinana, Octomaculana, Cembræ, Decrepitalis, and Trigonodactylus.—A. Adie Dalglish, 21, Princes Street, Pollokshields, Glasgow.

A few mounted Duplicates of Aphodius tessulatus, A. tristus, Epuræa pusilla, Ips 4-punctata, Anthonomus ulmi, Malthodes, etc. Wanted—Aphodii and other British beetles.—B. Tomlin, The Green, Llandaff.

Exchange.—Duplicates—Cardamines, Napi, Brassicæ, Urticæ, Edusa, Sibylla, Alsus, Sylvanus, Lucina, Tages, Caja, Lubricipeda. Desiderata—Ova and Larvæ of Sphinges and Bombyces.—W. Harcourt Bath, Ladywood, Birmingham.

Duplicates.—Loniceræ, Filipendulæ, Conigera, Tritici, Carpophaga, Capsincola, Cucubali, Elymi, Testacea, Zonaria, Ulmata, Biundularia, L. marginata, Ministrana. Desiderata—Very numerous to enlarge series.—John E. Robson, Hartlepool.

Wanted for types (condition immaterial)—Piceana, Scabrana, Mixtana, Capræana, Sellana, Marginana, Striana, Hybridana, Nisana. Will pay postage and do best I can in return.—W. Macmillan, Castle Cary, Somerset.

Types for beginners.—Have numerous duplicate moths to give away. Send box and return postage.—W. Macmillan, Castle Cary Somerset.

What offers for "Young Naturalist," Vol. I. to XI. (1890) bound in half roan, also "Bristish Naturalist," 1891, half roan, 1892-3, unbound. "Entomologist," 1888-9, half calf, 1890-3 unbound. "Zoologist," 1890-1, half calf, 1892-3 unbound. "Entomologist's Record," Vols. I., II., half calf, Vols. III. and IV. unbound. "British Noctuæ and their Varieties," 4 Vols. Merrin's Lepidopterist's Calendar (interleaved): Dallas' Elements of Entomology. Naturalists' Gazette, Vols. I.-III. half roan, and Jardine's Naturalists' Library, 31 Vols. 1st edition hand-painted?—D. S. Steuart, Owen's College, Manchester.

Desiderata.—Sinapis, Th. rubi, W. album, pruni, iris, Trochilium, all but tipuliformis. fuciformis, bombyliformis, porcellus, elpeuor, ligustri, rubricollis, complana, lurideola, pygmæola, deplana, aureola, griseola, muscerda, mesomella. Duplicates numerous, a list on application.—John E. Robson, Hartlepool.

Exchange.—Wanted—Magic Lantern Slides of Insects. Any order, and either eggs. larvæ, pupæ, perfect insects, or dissections desired. Will give Lepidoptera in return, or Cash.—John E. Robson, Hartlepool.

Exchange.—Marine Shells from New Zealand offered for foreign land and fresh-water shells, Microscopic slides illustrating useful or noxious insects, or botanical or entomological lantern slides.—W. A. Gain, Tuxford, Newark.

Exchange.—Wanted—Living pupæ (or empty cases) of Skippers, Psychids, and Hepiali, also larvæ and pupæ of Elachistas and Elachistids, and pupæ or cases of many Tineina and others. Will do anything I can in return.—T. A. Chapman, Firbank, Hereford.

MEETINGS OF SOCIETIES.

CITY OF LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY meets on the First and Third *Tuesdays* in each month, at the London Institution, Finsbury Circus, E.C., from 7.30 to 9.30 p.m.

ENTOMOLOGICAL SOCIETY OF LONDON, 11, Chandos Street, Cavendish Square, W. Wednesday, Sept. 6th, 1893, at 7 o'clock in the evening.

THE SOUTH LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY, Hibernia Chambers, London Bridge, S.E. Meetings: Second and fourth *Thursdays* in each month, at 7.30 p.m.

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the great sexton beetle *Necrophorus humator* besides endless quantities of *Cholevæ* and *Tachini*, beetles which elude capture by a swift and almost magical disappearance. None of these species were of much value. A much better find and more beautiful insect we took beneath a dead thrush in this same wood, *Necrophorus mortuorum*, with its brilliant black and scarlet wing cases.

Higher up, the larches give place to oaks and birch, and finally these thin out and leave only the rough gorse and fern of the open hill side. These oaks are all pale and grey to the utmost twig with a thick incrustation of lichen, whereas our lowland oak boughs are a rich clean brown. The cause of this difference is not quite obvious, perhaps the more moderate winds and humid air of this sheltered valley may encourage such growths, as it appears to favour other cryptogams such as ferns and mosses.

The Coleopterist finds but little here; the oaks do not of course as yet show even the smallest speck of leaf. The birches, where they cluster together thick in the hollows, exhibit a perfect harmony of tints of pink and purple, and warm Indian red, but only glazed here and there with the faintest veil of green. Thus, there is no beating possible, nor are there any stones just here, so we can but follow the lane still clear between the trees till it brings us out on the fell above. We have now left behind and below us the last oak and the last birch, and only the scattered ash trees still bear us company. We have indeed passed through arboreal zones distinct as those they tell us of on the flanks of Alp or Appennine. Far below us we can see the river gleaming between its sycamores—a tree that shuns the wind and loves the damp rich sands of the river levels. Higher up are wild cherries just now breaking into snow, then larches and oaks; higher up still, hollies and birches where the soil is thin and poorest, but highest of all the ash and contorted wind buffeted whitethorns. But on this open hill side, with its short grass and dead brown bracken stalks, the first beetle to be observed is *Olisthopus rotundatus*. This is not exactly a mountain species although it occurs more frequently at high elevations, but it is restricted always to dry and uncultivated lands. Under the next stone lurk a couple of *Patrobus excavatus* and with these we feel we have got amongst the genuine upland fauna. In such a place as this, however, the mountain and the lowland forms meet; here, for instance, we have *Chrysomela staphylæa*, *Badister bipustulatus*, *Othius fulvipenne*, *Calathus flavipes*, and here also are *Calathus micropterus* and *Corym bitesæneus*, distinctly mountain species. *Notiophilus æquaticus* is very common, the glitter of its polished elytra continually betraying it, as it runs among the short grass. A few *Byrrhus pilula* varying greatly in size, as is usual with this species, occur under stones, but one individual, conspicuous by a broad golden belt across the elytra, can be nothing else than *B. fasciatus*. Such it proved to be and made the first capture of a new species.

All this time we had been gradually ascending, pausing where the fallen stones lay thick under the steeper declivities, up by devious slopes ever higher, till where the gorse grows thicker and in hard rounded knobs, and the first tufts of heather appear. We are now above the last grey farm-house with its two or three encompassing ash trees bent and gnarled, above the last little rough enclosure where the lambing ewes are congregated. Nothing beyond us now but brown heather and the great peak clear cut against the blue. A mountain track crosses the pass here and winds down across miles of desolate moorland to the hamlet in the valley on the other side. Close by, the vivid sphagnum shows the natural line of drainage and the recent presence of water, and turning up a stone half buried in the ooze, we pick up a dusky *Hydroporus*. It is *H. ferrugineus*, that we can distinguish at once. This is rather a difficult genus, especially the black species, but this member of it is of a very broad short build and bears peculiar and unmistakable light markings on its elytra. It is a good beetle and is at once consigned to a special bottle. It was, indeed, all we found there. Later on we should obtain from this wet moss lots of interesting species, *Quedius auricomus*, *Dianous cærulescens*, *Stenus Guynemeri*, *Lesteva pubescens*, and *Euthia palustris*; but it is too early yet for any of these, so we cross the road and plunge again into the heather, here almost waist deep. As we struggle through it, a sharp broken cackle, and away go the grouse now paired for the season, we can see their rufous heather coloured backs far down the valley as they skim away on rigid wing. *Tetrao scoticus* seems indeed to be the commonest and most obtrusive bird of this region, but far away the other side the peaks, now and then the plaintive cry of the curlews breaks upon our ears and sometimes we may catch sight of them 'dreary gleams about the moorland.' Once we fancied we heard the shrill pipe of the golden plover but could not see the bird. A small brown pipit haunts the heather in great numbers, probably *Anthus pratensis*; but where the rock crops steeply out and is overhung by great bunches of bilberry and gorse, there assuredly we shall see the most characteristic bird of the mountain side, the Ring Ouzel, *S. torquatus*, and perhaps discover its well hidden nest and blackbird like eggs.

Returning to the Coleoptera; stones are not numerous among the heather, but beneath a large one we find *Carabus arvensis*. We have taken this beetle commonly, high up on the great Snowdonian mountains where it is generally of an obscure bronze colour or even dead black, but this specimen shines with the rosy effulgence shown by the first faint film of oxide on burnished copper. A common beetle here is *Harpalus latus* although not strictly a mountain species. A *Harpalus* similar but with black instead of red legs like *H. latus* arrests our attention and proves to be *H. ignavus.* At this elevation several melanic forms of *Notiophilus aquaticus* and *N. palustris* occur, while *Calathus micropterus* is by no means rare. *C. melanocephalus* which on real mountains shows a darker thorax, and in its extreme form on the Irish mountains is distinguished as *C. nubigena*, here is as brightly coloured as the ordinary red thoraxed lowland type.

The next noteworthy capture is an Elater, its elytra mottled with a thin golden pubescence. This is *Corymbites holosericeus.* We have only seen this insect from these or similar moors although the books do not mention it as a hill or heather loving species. The summit of the ridge, but curiously not the highest point, is crowned by what the casual tourist usually calls with double inaccuracy a 'Roman camp.' For these remains are neither of Roman origin, nor were they ever in the strict sense of the word, a camp. The Keltic word is *Cær*, the qualifying epithet of so many of the Welsh hills and obvious enough in such a name as *Cær*narvon. Here we can barely trace the faint impression of a ditch and mound surrounding a circular enclosure. Its history, builders, purpose, ages ago forgotten, who may tell what part these ramparts, their defenders and assailants took in the dim confused tribal feuds of Cymry and Kelt ? To us they only mutely tell—

> "Of old unhappy far off things
> And battles long ago."

Where the slopes flattened out towards the top of the ridge many small stones were lying scattered among the heather which here grew shorter and more diffuse. Turning over one of these we notice a flat looking beetle, black, with red legs and conspicuous red shoulders. We recognised him at once *Cymindis vaporariorum*, a very local insect and one which never occurs except among heather and only very sparingly there. This capture revives the flagging interest of the chase and we take a dozen or more of this *Cymindis* within a very few yards. One of the commonest species here is *Olisthopus rotundatus*, and with them we find now and then a beetle of about the same size and superficially not unlike that insect, but it appears more shiny, and looked at closer seems to resemble rather a large *Dyschirius.* It has the same short antennæ and globular thorax ; still it is no *Dyschirius*, the anterior legs are evidenty different. This, indeed, is none other than *Miscodera arctica*, a fine addition to the day's captures. It is a true northern species, from Scandinavia, Lapland, Siberia, Alaska, Newfoundland it has been reported. Here in Britain it is exclusively a mountain form always associated like the *Cymindis* with heather and in all probability a relic of the age of ice, and perhaps native here in lowland valleys long ages before the swarm of European immigrants, which followed in the wake of the lengthening summers, arrived to dispossess the aborigines, driving them up the hills or out of existence altogether. There are many such species faithful still to the secular traditions of their race. We sometimes speak lightly of the mutability of specific form, but instances like these impress us more with its persistence. Here we have a case where a period of perhaps more than a thousand centuries has failed to modify even the mere correlation which exists between the species and its environment, in this instance, of heather and quasi glacial conditions; and one would certainly imagine that racial habit would be less fundamental and more susceptible of modification than structure. Probably the former change would involve the latter, but in any case we have no reason to suppose that this *Miscodera arctica* we have just picked up from under a loose stone differs in the slightest degree from his ancestor who enjoyed his little span of life when the great glaciers of the Welsh hills shrank backwards up the valleys during the short summers of that rigorous age. Such considerations many indeed correct hasty assumptions as to the probable rate of evolution o species, and suggest some dim idea of the vast time required for the modification of even the simplest specific characteristics. Another insect we find also up here, to which the same remarks apply, *Pterostichus vitreus*. This species has a brassy look unlike most of the other *Pterostichi* besides being easily identifiable by the deep punctures on the elytra:—of this beetle we take quite a series. The commonest Brachelytra under these stones are *Othius fulvipenne* and *Xantholinus punctulatus* but we also take several specimens of *Conurus pubescens*. There are two *Bradycelli*, *B. cognatus* and *B. similis*—both very plentiful. For the mountain species *Nebria Gyllenhali* we search in vain. That appears not to be in any special degree a heather lover although generally taken at a high altitude, *Carabus catenulatus* of course occurs commonly, and of the other common Geodephaga met with up here there are *Clivina fossor*, *Leistus ferrugineus*, *Anchomenus parumpunctatus*, and four common *Ptetrostichi*.

Thus filling our bottles, like the net of the parable, with fish good and bad, we gradually approach the summit. Near the top, even after the long period of dry weather which we have been enjoying, the ground is boggy and there are deep peaty holes full of water. Trying some of these with the water net we find the principal result to be a mass of black and malodorous mud, one beetle only permits itself to be seen—and captured—an *Agabus* evidently, and on a hasty inspection we put it down as only *Sturmii*, one of the commonest of that genus. This beetle, however, was not *Sturmii*, careful examination at home revealed it to be *Agabus congener*, a much rarer insect. This was one of the best of our captures, superficially it is exceedingly like *A. sturmii* but the wholly black thorax at once distinguishes it. It seems to be quite a mountain species. We find the net no manner of use for the small *Hydropori* with which we can see that the pool abounds, a steady hand and an inverted pill box proves to be a more excellent method of ensuring their capture. They are very numerous and appear to be of two kinds, a black and a red, the red ones without exception proved to be *H. gyllenhali*, and none *H. obscurus* as we expected. The black are principally *H. morio (Atriceps)*, rather an uncommon species, there were also a few *H. pubescens*, rather darker than the usual type, and one specimen which we conclude after careful examination to be *H. melanarius* or *monticola* of Dr. Sharp's Catalogue. This was a most satisfactory capture, indeed one of the best things our expedition yielded. The worst feature of this group of *Hydropori* is the difficulty, indeed usually the impossibility of recognising the species on capture, and therefore unreturning opportunities are not made the most of; on the other hand it is an excellent genus for yielding surprises to patient investigation at home. On this occasion the exploration of this small pool was all that we attempted among the *Hydradephaga*, with the notable exception of *H. ferrugineus*, taken on our way up. We were now on the very summit, but the scattered stones of the ruined ordnance cairn there, at so bleak an altitude only yielded a few more *P. vitreus* and *M. arctica*, and we were not unwilling to rest for a moment and look around. Away to the eastward a dim bank of smoke hung over the collieries and ironworks of the English border; but north and south moorland lay beyond moorland, summit behind summit in brown undulations of endless heather. Far to the west the trifid peak of Snowdon clear on the horizon just split the setting sun, and a thin cold wind admonished us of what we had well nigh forgotten during the day, that we had hardly as yet stepped clear of the winter solstice, and indeed months after this date we have seen all these hills buried deep in snow. On this occasion we might well deem ourselves fortunate, we had taken nearly all the species peculiar to the hills, and a few others besides; something like ninety-six species had been noted since the morning, many of course common and ubiquitous, but several distinctly local, and one or two even rare. It will be observed that with the exception of four *Clavicornia*, three *Sternoxi*, two *Phytophaga*, two *Aphodii*, all of these were amongst the *Adephaga* or the *Staphylinidæ*. The *Aphodii* were *A. lapponum*, quite a mountain species and a single specimen of *A. prodromus*. We took no species of *Rhyncophora* and among the *Phytophaga* only *Chrysomela staphylæa*, and *Adimonia suturalis*. It is interesting to remark that very few of even the Geodephagous beetles proper to the valley, such as the river *Bembidia*, had as yet appeared, whereas on the exposed hill sides the whole of its peculiar fauna seemed to be as much in evidence as they would be on any day during the summer. Probably all these were hybernated individuals but of the obscure subject of the hybernation of the Coleoptera, and their larval times and seasons and pupal duration, hardly anything seems to be as yet known.

As descending we left the heather and dropt out of hearing of the last far off Curlew's cry, the shadow of the hills stretched right across to the opposite ridge and left all the valley in deepening gloom. Lower down the roosting pheasants crowed in the larch woods, and a few battered *H. programmaria* flitted aimlessly across the deep lanes. Still lower we catch the faint murmur of the river yet far below us, and clearer and clearer its music breaks on the stillness of the evening, till at length we stand again upon the bridge, and watch the quiet bats cutting with their unsteady flight the fading sunset glow in the great salmon pool. Arcturus already shines bright as a planet in the North, the twilight deepens into night, and our day among the hills is ended.

Lidsham, Cheshire.

THE GENUS RISSOA.

(Continued from page 123.)

BY B. TOMLIN.

The next species on our list is *R. cancellata*, Da Costa, the only important synonym being *R. crenulata*, Mich.: of recent years (in 1884, I believe) this has been made the type of a new sub-genus *Acinopsis*, by Monterosato, based merely on the presence of a tubercle at the base of the columella and a slight channelling at the bottom of the mouth. This tubercle, besides being not absolutely constant, is only a thickening of the usual deposit on the columella or pillar in the adult stage, and neither feature seems substantial enough for the proposed isolation of a shell, which is so essentially an *Alvania* in sculpture; the lattice-work of this species (in *fresh* specimens of course) is extremely strong, producing deep pits, and giving the shell quite a prickly appearance, as Dr. Jeffreys says. This is its most marked feature and at once distinguishes it from the two preceding species, which have nothing like this coarse, strong cancellation (which the specific name emphasizes). It is about equal to them in size, perhaps on the average slightly smaller, but there is a rather wide margin of variation in size (? sexual). This feature has been noticed in almost every species of the genus, which is hence plentifully sprinkled with vars. *major* and *minor*! Live specimens are tinged with red as a rule, on a whitish-yellow ground, but the dead shells usually seen in collections vary according to the date of their decease from brownish-yellow to white. Though the sharpness of the sculpture gets rubbed down in these more decrepit individuals, the "pits" are generally more or less visible owing to the high-relief of the original ribs, which are moreover very equal in size (i.e. the "longitudinals" and the "spirals"). The above-mentioned tubercle will be of considerable use in certifying the species. It is common in the Mediterranean and from England downwards. On our shores it is locally plentiful alive, if you can only hit upon a favourable spot, but seems chiefly confined to the Channnel Isles and S.W. of England. Isolated records have occurred up the W. coast as far as the Hebrides, as well as in Ireland, and I can add Ilfracombe (in drift) to those in Jeff. B.C., IV., 9. It usually lives at extreme low tide under stones and is markedly gregarious. At Herm I once took 50 alive off one stone. The well known shell beach on this island is extremely prolific in dead specimens, and, as it is a stout shell, they are seldom broken. As far as my experience goes, it does not live under deeply buried stones, but under those that leave some space above the ground. Of varieties I find—

FORM.

Var. paupercula, Jeff. (= *minor*, Monts.) shell dwarfed and proportionately longer.

Var. varicosa, Bucquoy, having varices.

COLOUR.

Var. lineata, Monts., having the spiral ribs red.

Var. unifasciata, Bucquoy, having a red band below the suture.

Canon Norman quotes a *var. hirta*, Monts., but I do not know its characteristics.

Llandaff.

ENTOMOLOGICAL NOMENCLATURE.

BY C. W. DALE, F.E.S.

Dr. Buckell states, on page 181 of the current volume, that Leach's name *Gonepteryx* for *rhamni* was deliberately rejected by Boisduval on account of its too great similarity to *Gonoptera*. But he seems to ignore the fact that Staudinger replaces the generic name *Gonoptera*, Latr., with the older one of *Scoliopterxy*, Germ. Such being the case, he ought to have replaced *Rhodocera* by *Gonepteryx*.

Dr. Buckell also states that the balance of authority is seen from the summary he gives to be rather in favour of the use of *Lycæna* for the Blues. But *Polyommatus*, meaning many-eyed, is more typical of the Blues than the Coppers, and Latreille moreover says that the most common of them in the environs of Paris is *P. alexis*. Therefore, if *Lycæna* be used as the generic name of the Blues, it is best for *Polyommatus* not to be used at all. Surely Dr. Buckell cannot have read what I have stated on page 146 of the current volume: "To my mind the law of usage ought to override the law of priority"; or he would not have included me in the ranks of what Mr. Robson once called the "resurrection men."

With regard to *minimus*, Fuessl., Dr. Buckell seems to ignore the fact that it is not the smallest of even European Butterflies. He states truly that the law of priority was not formulated at the time of Esper and Fuessli's works. I think it is a great pity that it ever was formulated at all. Suppose such a rule was formulated in regard to the names of London and our other English towns. What would happen? A state of confusion. Such has been the case (and perhaps now is) in "Entomological Nomenclature."

Dr. Buckell says the earliest of Hubner's works is dated 1785. Edward Newman (see "Zoologist," Vol. XXX., p. 3131) says that Hubner, in 1776, figured a butterfly as *Papilio medea*. Possibly Mr. Newman knew of an earlier work of Hubner than Dr. Buckell does, and I may not have erred in following Newman. But is *Æthiops*, Esp., the same as *Medea*, Hub., or *Blandina*, Fab.? Several of the old authors consider it to be identical with *Medusa* or *Ligea*. De Villers gives both *Æthiops-major* and *Æthiops-minor*. The former is considered identical with *Ligea*, the latter with *Cassiope*. Staudinger gives *Malvæ*, L., as being identical with *Alveolus*, Hub. Linnæus describes *Malvæ* thus—"267, P.P. alis denticulatis divaricatis nigris albo maculatis. Habitat in Malva, Althæa." Does this agree with our Spotted Skipper? The larva of which feeds on Rubus, Genista, and allied plants. It is more probably *Alceæ*, Fab., *Lavatheræ*, Esp. Staudinger supercedes *Linea*, W.V., with *Thaumas*, Hufn., 1766. *Sylvestris*, Poda., 1761, appears to me to be a still older name for it. But why should not *Linea* be retained as the most suitable name for the species? If *Linea* be altered to *Thaumas*, what becomes of *Lineola?* Alter it to *Thaumaseola?* It was once asked if *Dictæa* was to be altered into *Tremula*, whether *Dictæoides* was to be altered into *Tremulæoides*, see "Entomologist's Monthly Magazine," Vol. VIII., p. 95. Staudinger gives *Cossus* as both the generic and specific name of the Goat Moth. Here is a stupid instance of the law of priority being enforced. It ought either to be:—

Cossus, Fab., 1794.
ligniperda, Fab., 1794.
or
Xylentes, Hüb., 1816.
cossus, Linn., 1758.

Staudinger bestows the name *Hethlandica* on the Shetland form of *Hepialus humuli.* Newman's name *Thulensis*, "Entomologist," Vol. II., p. 176, is earlier. Let us take the genus Sesia. Mr. South in his Catalogue gives *Culiciformis*, L., which is right as *Culex* is masculine; but he also gives *Myopiformis*, Bork., which is wrong as *Myopa* is feminine.

In my last communication "British Naturalist," p. 187, *bellans* is unfortunately spelled with *u* instead of *n*.

Glanvilles Wootton, Sept. 8th, 1893.

Reports of Societies.

CITY OF LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY.

Tuesday, 5th September, 1893.—Exhibits: Mr. Prout, a variety of the underside of *Lycæna corydon*, a pair of *Leucania albipuncta*, and a red var. of *Hadena suasa*, all from Sandown. Mr. Hollis, a specimen of *Arctia caja* with orange hind wings, and a pale specimen of *Chortobius pamphilus* with dark borders to the wings. Mr. Battley, a series of *Leucophasia sinapis* (2nd brood) from Sidmouth, S. Devon. Mr. Clark, three varieties of *Arctia lubricipeda* vars. *zatima* and *deschangei*, bred by Mr. Harrison of Barnsley. He also exhibited a large number of insects taken during July in the New Forest. These included *Argynnis paphia* with its var. *valezina* and intermediate forms, *Xanthic* specimens of *Satyrus janira*, suffused examples of *Ennomos angularia*, *E. erosaria*, black *Boarmia abietaria*, *Lithosia quadra*, *L. helveola*, *Catocala sponsa*, *C. promissa*, *Ebulea stachydalis*, *Tortrix piceana*, and many others. With regard to the varieties of *A. paphia*, Mr. Tutt remarked that several of the males were distinctly green on the hind-wings, and that these specimens frequently developed pale spots on the fore-wings, thus showing a double tendency towards var. *valezina.* Dr. Buckell, a series of *Apamea oculea*, all taken in one evening at Highgate, also other forms for comparison. Mr. Lane, a bred series of *Thecla betulæ* from Epping Forest. He remarked that his experience of this species was directly contrary to Mr. Nicholson's, expressed at the last meeting, only about one-fifth of the specimens bred being females. Mr. Smith, *Lithosia complanula*, *L. griseola*, and var. *stramineola*, all from Dorset, and *Ennomos erosaria* (bred) from the New Forest. Mr. Huckett, specimens of *Arctia caja*, bred within the last few days (2nd brood) and a lead coloured male of *Lycæna adonis*, taken at Folkestone on 23rd August, 1893. Dr. Sequeira, *Boarmia repandata*, *Ephyra porata*, *E. punctaria*, *E. orbicularia*, and the second brood of *Lycæna argiolus*, all from the New Forest.

Coleoptera: Mr. Heasler, *Staphilinus stercorarius* and *Hipyodamia* 13-*punctata*, both from Teddington. Dr. Buckell stated that he had counted the heart-beats in the larva of *Phlosophora meticulosa*, and found them to be 44 to the minute. He also made some remarks upon the experiments now being conducted with regard to the powers of speech in the apes. Capt. Thompson recorded a specimen of *Nonagria lutosa* in High Street, Islington. Mr. Huckett stated that he had noticed a sallow and a pear tree in blossom at Folkestone, and several cases of second flowering were recorded by other members. A discussion also took place with respect to the absence of the autumnal larvæ this season, Mr. Tutt expressing his opinion that they had emerged from the egg early in the season, and feeding up rapidly, passed into the pupa towards the end of July. Dr. Buckell and Mr. Riches however stated that the common species had been comparatively scarce this season in their gardens.

Tuesday, 19*th September*, 1893.—Exhibits: Mr. Huckett, a smoky var. of *Arctia caja*, a partly silvery specimen of *Polyommatus phlœas*, and bred series of *Angerona prunaria*, *Boarmia repandata*, *Numeria pulveraria*, and *Pericallia syringaria*. He stated that the specimen of *Arctia caja* was one of the second brood, and that some pupæ that failed to emerge, were found upon examination to include several dark and pale varieties. Mr. Clark, bred specimens of *Cerura vinula*, including a specimen with a pale blotch around the discoidal spots on the fore-wings. Dr. Sequeira, a large number of insects from the New Forest, including *Lithosia quadra*, *Nemoria viridata*, *Scotosia undulata*, *Aventia flexula*, *Crambus sylvellus*, and many others. Mr. Battley, a bred series of *Macroglossa stellatarum*, from Sidmouth. He remarked that this species had appeared in some numbers this season, several having been observed in Clapton, and other parts of North London. Mr. Hollis, *Heliophobus popularis*, a var. of *Melanippe fluctuata* with the band reduced to a small blotch on the costa, *Pterophorus monodactylus*, &c., all from Highgate. Mr. Prout, dark vars. of *Odontopera bidentata* from Rannock, with Hale End and Sandown forms for comparison. Mr. Baxter, a fine series of *Agrotis tritici*, *A. cursoria*, and *A. nigricans*, from St. Annes-on-Sea. Mr. Bloomfield, *Melanthia albicillata* and *Boarmia repandata* from Ringwood. Mr. Riches, *Triphæna fimbria*, *Agrotis suffusa*, *A. nigricans*, &c., from Highgate Woods.

Coleoptera: Mr. Lewcock, a series of *Mezium affine*, *Xestobium tescellatum*, and other London coleoptera. Mr. Heasler, *Trechus secalis* and *Hypophlœus bicolor*, from Wanstead Park. Mr. Battley reported that insects were abundant on sugar and lamps at Winchmore Hill, and that he had taken the following species there:—*Asphalia diluta*, *Agrotis suffusa*, *A. puta*, *Anchocelis litura*, *Xanthia citrago*, *X. cerago*, *X. gilvago*, *Hadena protea*, *Ennomos fuscantaria*, and many others.

THE SOUTH LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY.

September 14*th*, 1893.—J. Jenner Weir, Esq., F.L.S., F.E.S., President, in the chair. Mr. Auld exhibited living larvæ of *Phorodesma smaragdaria* also two breeding cages for larvæ, as described in the "Entomologist's Monthly Magazine" for July last, by Mr. H. G. Knaggs. Mr. South showed a fine series of *Spilosoma lubricepeda*, vars. *zatima* and *radiata*, a splendid var. of *Argynnis euphrosyne*, taken in Lancashire, a pale var. of *Vanessa urticæ*, from Monmouthshire, a bluish specimen of *Procris statices*, and a number of *Zygæna trifolii*, including almost all the known forms. Mr. Tutt mentioned that out of about 200 specimens of this insect taken in North Kent last year, five only were absolutely typical, the remainder having a tendency to assume a six spotted form, these in most cases being well marked and similar to *Z. filipendulæ*.* Mr. Weir said these two species do occasionally cross in a state of nature. Mr. Fenn exhibited long series of *Spilosoma lubricepeda*, var. *radiata*, bred from ova received from Mr. Tugwell, *Gnophos obscurata*, from Folkestone, and *Macaria notata*, bred from ova. Mr. Fenn also exhibited *Silenia lunaria*, and read a note thereon. Mr. R. Adkin exhibited a series of *Thecla betulæ*, and read a note with reference to the order of sexual emergence. He also showed a short series of *Pygæra reclusa*, bred from larvæ taken in Sutherlandshire last Autumn. Mr. Jenner Weir read a note in which he stated that in a recent tour in Belgium, he had seen no *Colias hyale*, and but one *C. edusa*. He also stated how exceedingly abundant the third brood of *Polyommatus phlœas* had been in his garden at Beckenham this September.

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*Mr. Tutt gave me a series of these specimens in the early part of this year. They are nothing but a rather small species of *Filipendulæ*. He has since sent examples to Mr. Pierce, who examined their genitalia and found them to be *Filipendulæ*. Mr. Tutt said search for *Trifolii* characteristics, but they were not to be found.—J.E.R.

Mr. Tutt gave his experience of a day amongst the Lepidoptera in the suburbs of Paris at the beginning of August, when *Colias hyale* was in numbers, with *Agrophila sulphuralis, Acontia luctuosa*, &c., &c., and many other species in great numbers. Mr. Enock exhibited wheat stems containing pupæ of the *Hessian Fly*, from Sidmouth, where he found it infesting the wheat and barley, also examples of *Chlorops tæniopus*, the destructive Ribbon-footed Corn Fly.—H. WILLIAMS, *Hon. Secretary*.

General Notes.

"STRANGE BUTTERFIES: A NOTE FOR NATURALISTS.—During the hottest part of the weather four or five weeks ago, a number of large, beautiful and strange butterflies were seen in the district lying between Victoria Square and Kilton Fields, and several were captured, in some instances with much difficulty, as the butterflies were nearly as large as birds, measuring from tip to tip of the wings five and a half and six inches. There were two kinds noticed, one a pale green with beautifully tinted moon-shaped spots, and the other, somewhat larger, brown in tints, and hardly so handsome, yet possessing great beauty. About a dozen of the two kinds were known to have been caught, and much curiosity was shown about them as it was evident they were not English butterflies. Two of these came into the hands of Mr. Robert Kirk, 94, Newgate Street, who, sketching them in colours, sent the drawings to a naturalist in London, who in reply said he recognised the pale green one as the Luna moth, and the other as the Silk Spinning moth, both natives of the United States. The probability is that the pupæ of both moths came to England in some timber to one of the wood yards in Worksop, and lying fully exposed to the heat of the hot summer, the chrysalides developed into the perfect moths. Mr. Kirk will be glad to show his moths, and one, the pale green Luna moth may be seen at the "Times" Office, Worksop, by anyone interested in this note. All the specimens are in a damaged condition."

A correspondent has forwarded us the above cutting from the "Retford and Gainsborough Times" of 8th September. The green moth is no doubt *Actias luna*, but the other is more doubtful. The conjecture as to their origin is absurd, most likely they had escaped from the breeding cage of some Entomologist. Many of the American Bombyces may be reared in the open air in this country.—ED. B.N.

THE SEASON.—On 1st September I found a young Spink just out of the nest, and unable to fly. Yesterday (15th September) I saw wild roses, the ordinary pink, and the small white one, both surrounded by ripe hips. The Red admiral has been very abundant, and *Stellatarum* common.—W. A. GAIN, Tuxford.

VANESSA ATALANTA.—This butterfly has scarcely been seen in this neighbourhood for a quarter of a century. This year it is most abundant even in the town. My daughter saw six at a sunflower in a garden on the cliff, and a day rarely passes without specimens being brought me by childron who expect pennies for all they bring. *Urticæ* swarms in the town.—JOHN E. ROBSON, Hartlepool.

DOUBLEDAY'S LIST, 1ST EDITION.—My Doubleday List is Second Edition, 1859, with all the errors mentioned corrected. The first 8 pages are marked B. and the last F., and the title is—
"The Exchange Synonymic List of British Butterflies and Moths by Henry Doubleday. The arrangement and nomenclature by M. Guenee. Second Edition with Supplement. London: Edward Newman, 9, Devonshire Street, Bishopsgate. Second Edition, 1859; Supplement, 1868. Price Sixpence."

G. C. BIGNELL, Stonehouse, Plymouth.

The enquiry was made respecting the First Edition of Doubleday's List. Mr. Bignell's note refers to what may be called the second issue of the Second Edition. The Second Edition was issued in 1859. It was called "The Zoologist Synonymic List," otherwise the title is as quoted above, except that there is no reference to the Supplement, which appeared in 1868. A second Supplement was issued in 1873, but I have not seen a copy of the List bound up with this for sale.

Your copy of Doubleday's List of British Lepidoptera, is, I should hope, quite unique in its irregularity. My copy contains none of the peculiarities you write of. It was purchased from time to time as it appeared. I was at the time a particular friend of Edward Newman, the printer. I have also the first supplement, 1865, and the second supplement (including the first), 1866. The only omission of consequence that was noticed at the time of publication was that of the omission of *Tortrix corylana* page 21, As you say the pages 1—8 are on paper without any blue tint, all the others are printed on bluish paper, 9—27.—J. JENNER WEIR, Chirbury, Kent.

COLEOPTERA IN THE LONDON DISTRICT.—During a few weeks stay in London, I made five excursions to various localities for Coleoptera, but, owing to the very dry season, my captures did not amount to much. My first excursion was to Mitcham Common, on August 21st, I was very much disappointed to find that all the ponds and ditches were quite dried up, and there was nothing to be obtained on the Common with the exception of a few *Onthophagus fracticornis* and *Aphodius rufescens.* The second outing; to Boxhill, on August 24th; was rather more successful. By sweeping I obtained the local *Thyamis distinguenda* in abundance, also a few *Apthona herbigrada*, *Haltica ericeti*, *Agelastica halensis*, *Apteropeda globosa* (1), *Ceuthorrhynchus* *asperifoliarum* (1), and many very common species. Among some refuse I took 4 *Lithocharis brunnea*, and my nephew, who accompanied me, found a *Licinus depressus* under a stone.

My next and most successful day's collecting was at Rainham, Essex, on August 28th. The collecting was on the banks of the Thames, where common beetles were in greater abundance than I have seen them, in the London district, this season. Under stones, &c., I obtained a nice series *Amara convexiuseula*, together with a few *A. similata*, and two or three very common species of the same genus, *Ocypus ater* swarmed and *Bembidium femoratum*, *B. concinnum*, *B. riparium*, and two or three others were all more or less common, as also were both species of *Dichirotrichus*. Among some refuse we discovered a leg of mutton which was decidedly "high," out of which we beat about 180 *Corynetes ruficollis* and 140 *C. rufipes*, a smaller series of *Dermestes vulpinus* and plenty of *Creophilus maxilosus*. From some bundles of reeds I shook out a number of *Anthicus antherinus*, *Olibrus consimilis*, *Dromius melanocephalus* (abundant), and many other common species, also a few *Anchomenus atratus*, *Nonagria lutosa*, and several other common *Noctuæ* were shaken out in some numbers.

On August 30th I paid a visit to Richmond, my best capture in this locality being a specimen of *Prionus coriarius*, which I found at the roots of an old elm, this insect evidently occurred in some numbers, judging by the number of elytra, &c., we found; we also picked up several dead *Lucanus cervus*, mostly ♀. In fungi *Quedius peltatus* and *Baptolinus alternans* occurred together with the usual crowd of *Homalotæ*, &c. In the trunk of a felled elm I discovered a large colony of *Rhyncolus cylindrirostris*, we took about 170 and left a great many more behind. Sweeping yielded scarcely anything worth recording with the exception of a single *Cassida nobilis*. *Olibrus æneus* was common in one field.

My last excursion was to Oxshott, Surrey, on August 31st, my best take on this occasion was *Balaninus nnbidus*, of which I beat a single example from birch. *Coccinellida* turned up abundantly by beating the firs and sweeping the heath, the commonest species being *Coccinella* 18-*guttata*, while *C. oblongo-guttata*, *C. ocellata*, *C. hieroglyphica*, *C. variabilis*, *C.* 11-*punctata*, *C. bipunctata*, and *Chilorcorus bipustulatus* were all more or less common. I also beat a single specimen of *Coccinella* 16-*guttata* from the firs and one *Exochomus* 4-*pustulatus*. By general sweeping, odd specimens of the following occurred, *Scymnus discoideus*, *Epnræa melina*, *Olibrus consimilis*, *Salpingus castaneus*, *Adimonia suturalis*, *Strophosomus limbatus*, *Otiorhynchus ovatus*, &c.

Owing to the drought, I have found Coleoptera decided scarce, this season, wherever I have collected.—A. FORD, Glen Mount, Braybrooke Road, Hastings.

THREE SWALLOWS IN ONE NEST.—Some Swallows built a nest this year in the verandah of Bockleton Court, near Tenbury, in Worcestershire. When one of the birds began to sit it was remarked that *two* others were feeding her. As this went on during the whole period of incubation, it was noticed over and over again, and there could be no possible doubt about the fact. For aught I know this may be a common occurrence, but it strikes me as being rather curious, and I should much like to know whether a similar domestic arrangement has often been observed.—F. E. PRESCOTT-DECIE, 14, Kensington Gate, London, W.

HOW MANY SPECIES ARE THERE OF BRITISH LAND AND FRESH-WATER MOLLUSCA?—A reader of the "British Naturalist" has written to ask the above question, and as it is one frequently put by those just commencing to take an interest in the subject, I have promised to reply somewhat fully.

The fresh-water species are usually considered to number forty-seven. To these some writers add four species of *Hydrobia* which inbabit brackish water and *Otina otis* which is better placed among the marine species. This raises the number to fifty-two. From this number, besides the species just named, may be taken *Anodon anatina*, perhaps a variety of *A. cygnea*, and *Limnaea involuta*, probably a variety of *L. peregra*, as well as *Physa aeuta*, which though a good species is confined to warm water-tanks in one, or at most two localities. This will reduce the number to forty-four.

The smallest number to which the land species can be reduced is seventy-nine, to these is generally added *Testacella scutulum*, now regarded as a distinct species. The following three species have been recently introduced, or at least recently discovered in this country, and may possibly continue with us, *Hyalina petronella*, *Helix elegans* and *Pupa cinerea*. *Bulimus (Stenogyra) Goodallii* and *B. octona* have about the same claim to rank as British as *Physa acuta*, being confined to hot-houses, into which they have been introduced with foreign plants.

The following species have been found once or more in the British Islands, having been probably introduced by accident or design, *Helix villoso*, *H. lactea*, *H. personata*, *H. aperta*, and *Clausilia solida*. *Vertigo lilljeborgi* and *V. tumida* were formerly considered valid species, now they are classed as varieties of other species. *Limax tenellus* is not now known. *Clausilia parvula* has been included in the list, small examples of *C. rugosa* having been mistaken for this species. *Succinea purvula*, *S. suecica*, *S. acuta*, *S. vitrea* (a var. of *S. putris*) and *Helix cantianiformis* (a var. of *H. cantiana*) also appear on some lists. To these may be added *Helix lampra*, a species manufactured out of *H. ericitorum* by some continental conchologists. To these remain to be added six slugs, *Arion ambiguus*, *A. celticus*, *A. cottianus*, *A. lucitanicus*, *Limax cinereo-niger* (a var. of *L. maximus*) and the semi-marine *Oncidium (Peronia) celticum.*

Which of the first four further experience will decide to reduce to varietal rank remains to be proved. If the whole of the twenty-seven mentioned be added, the number of British land mollusks will be brought up to one hundred and six.—W. A. GAIN.

SLUGS.—Mr. W. E. Collinge of Mason College, Birmingham, is about to bring out a new publication entirely devoted to Slug literature. Assistance has been promised by most of the leading malacologists of the the continent as well as of this country. The new publication will be entitled "The Journal of Malacology." The only regretable incident connected with the new work is that it sounds the knell of our old and valued friend "The Conchologist."

SUGARING.

Various comments on the records that have appeared, have been sent me by interested correspondents. Among others, Mr. Lewcock writes :—"Do you not think there are other points to be brought out in reference to sugaring. One is the hour at which certain moths come to sugar, while others will not come at all or only sparingly. The nights I considered best were dull with drizzling rain. Wind was not a great detriment, only bottling was more difficult. We ought to get something practical from all these records, something concerning the habits of the species. The main thing, I take it, in the life of the imago, is pairing, and spread what dainties we like, we cannot entrap a female while busy in depositing her ova. Of course, an impregnated female may be taken on sugar, and will commence depositing her eggs at once, but that is not what I mean. For instance, you will sometimes find a poplar tree literally beset with *A. megacephala* all depositing eggs, and no attraction will induce them to desert till they have completed their deposit. Certain of the Sallow moths seldom come to sugar, but will readily go to limes. Some swarm on the heath like *Porphyea*, but not at sugar. *Sponsa* and *Promissa* come out early in the evening, even during daylight. The *Leucaniæ* come out at twilight, and the *Agrotidæ* after twilight. These and many other points require to be brought out in the investigation."

I would state that many of the observers have recorded the time at which the various species came to sugar, but, in preparing them for the press, I found it would take up a great deal of space to include this, it is therefore reserved for tabulation afterwards. Many other suggestions will be duly attended to when the records are completed, and any hints or comments will be welcome in the meantime.

No systematic records of sugaring have been attempted before, and we must not expect to solve all the problems connected with it in one season. If we learn enough to show in what direction our investigations should be made, it will be very satisfactory for one season. I hope to complete the publication of the selection I have made of this year's records in the present volume, after which I will tabulate them in different ways.

I had intended to print such records as were selected, strictly in order of date, but one or two have reached me since the last appeared, that being of earlier date, are from localities of different character, and in a different part of the island. I therefore print a few of these early ones, which are interesting for comparison with others on the same dates in other places, and incorporate the others as far as possible in their places.

YORK.—21st March, 1893.

Wood, near Strensall, of birch, oak, beech, &c.; wind N.E.; sky obscured. Had been a very hot sunny day. I sugared 46 trees, but not a single moth appeared. Tree trunks were searched before dark without any result. Three sallow trees in full bloom produced 1 *T. cruda* and 1 *stabilis*; a second shaking gave me 1 *gothica*. A few *H. progemmaria* were about the hedges.—W. Hewett, York.

MARKET WEIGHTON.—1st April, 1893.

Houghton Wood; wind N.E., cloudy; a few drops of rain fell up to 11 p.m. after which there was heavy rain for four hours. Sugared about 100 trees, principally fir. Result: 1 *C. vaccinii* and 1 *T. crepuscularia*, a worn female, which has laid me about 200 eggs, which hatched on 18th April. At rest I took 1 *L. lobulata*, and on the wing 1 *C. suffumata*, an early date for both species.—ID.

YORK.—19th April, 1893.

Wood, near Strensall; wind N.E.; cloudy, but dry. Before dark I found 3 *T. biundularia* on beech, 10 *L. lobulata* chiefly on birch, one ♀ being of a beautiful greenish colour with brown band across the wings. I took 1 *T. unidentaria* on the wing. I sugared 50 trees which produced *C. vaccinnii* 6, *S. satellitia* 2.—ID.

DONCASTER.—19th May, 1893.

Open ride at side of wood; wind S.W., slight; sky variable, from overcast to clear, with young moon; atmosphere damp, heavy rain about 8-20 when I was applying sugar; it seemed an ideal evening for sugaring. I suppose notices of such out of the way things as *Bufo* are acceptable. Results: *C. porcellus* 1, *A. basilinea* 1, *R. tenedbrosa* 1, *A. rumicis* 2, *G. libatrix* 1, *Bufo vulgaris* 1.—Dr. Corbett, Doncaster.

Redmire.—20th May, 1893.

Border of wood and trees in field close to the banks of the Yore; wind W.; cloudy and damp, rain falling slightly all the time. Results at sugar: nil. Before dusk, found 3 *A. psi* at rest on fir, *M. montana*, *R. cratægata*, *E. albulata*, and *C. pusaria* fairly common on the wing. Took 1 *A. basilinea* and 1 *S. lunaria* in grand condition about 10 p.m.—W. Hewett, York.

Askham Bog, near York.—2nd June, 1893.

Wind S.E., overcast but dry. Sugared about 60 trees, principally birch and alder. Results: H. *thalassina* 1, H. *oleracea* 1, *M. fasciuncula* 1, *A. rumicis* 1, *X. rurea* 2. Saw *M. montanata*, *subtristata*, and *R. cratægata* common on the wing. Took 2 *P. lignata*.—Id.

Askham Bog.—3rd June, 1893.

Wind N.E., cloudy, damp. Sugared 150 trees in wood at end of Bog and about 30 in the open. Results: *A. rumicis* 1, *A. menyanthidis* 1. Took several *T. biundularia* also several of the var. *Delamerensis* at rest on beech. Beat 3 to 6 *L. marginata* at once, took *E. albulata* and *L. mesomella* on wing.—Id.

Epping Forest.—21st June, 1893.

Wood; wind S.W., light; clear, a few light clouds, dry; moon in second quarter. Geometræ flying freely. The noctuæ at the sugar all seemed remarkably shy, it being almost impossible to box any of those species which are usually very quiet. Results: *T. derasa* 2, *batis* 3, *N. augur* and *festiva* common, *D. oo* 3, *A. nebulosa* 1, *X. polyodon* 2, *M. strigilis*, *N. brunnea*, *baja*, and *A. psi*, a few of each.—E. H. Taylor, London.

York.—26th June, 1893.

Askham Bog; wind S.W., slight; cloudy, but dry, the night very warm and close. It began to rain about 10-45 p.m., so only went round the sugar once. *H. hectus* and *C. sparsata* were common. I took about 40 of the latter and saw many of the former paired on the stems. Sugar results: *T. pronuba*, *N. augur*, *N. rubi*, common, *H. thalassina* 8, *A. leporina* 2, *A. gemina* worn, *N. c-nigrum*, *L. pudorina*, *A. segetum*, *exclamationis*, *L. pallens*, *M. strigilis*, var. *Æthiops*, *fasciuncula*, *H. oleracea*, *N. plecta*, all common, *O. suspecta* 3 (a very early date) *B. repandata* 5, *A. aversata* 1, *C. bilineata* 2, *C. sparsata* 3.

This was the best night of the season so far, in fact the first at which moths were really numerous at sugar, as many as 16 or 17 being on a single patch. I sugared about 150 trees, mostly in the wood, but some also in the open. A beau ideal night for sugar and one on which I have almost always found moths common, viz.: cloudy, warm and close, wind S.W., and slight breeze.—W. Hewett, York.

MARLBOROUGH, 1st July, 1893.

Wind W., scarcely perceptable, clear, dry. No fresh sugar laid on. *A. exclamationis* 2, *T. pronuba* 1, *A. basilinea*, *A. ligustri* 1.—H. S. May, Marlborough.

WOODSTOCK, OXFORD.—1st July, 1893.

Side of stream bordering small wood; wind S., very slight; clear, very dry; temperature 65°. A fair number of Geometræ on the wing, I noticed *L. conigera*, *L. impura*, C. *trapezina* on honey-dewed leaves. At sugar there was only 1 *N. augur*.—J. H. D. Beales, Kiddington Rectory.

MARLBOROUGH.—3rd July, 1893.

Wood; wind S., variable, moderate; very clear, and dry. Sugar produced *N. depuncta* 1, *T. pronuba* 1, *A. ligustri* 1, *L. pallens* 2, *lithargyria* 1, *A. advena* 1, *X. polyodon* 3, *A. exclamationis*, and *M. strigilis* numerous. —H. S. May, Marlborough.

LONDON.—3rd July, 1893.

Lark's Wood, Hale end; wind E.S.E., rather strong, falling after the treacle was on; sky clear, dry. Geometræ abundant on the wing at and before dusk. At sugar were *A. gemina* 1, *X. polyodon* 2 or 3, *T. derasa* 3, C. *affinis* 2, *N. augur*, several, *N. triangulum* 1 (much worn), *M. strigilis* 1, *X lithoxylea* 1. On the wing *T. pronuba* 1, *L. pallens* 1.—L. B. Prout, London.

BRIDESTOWE, DEVON.—3rd July, 1893.

Close to woods, marshes, &c.; no wind; sky clear; dry. There was no moon, but the stars were so bright the night did not seem dark enough. Results: *A. rumicis* 2, *L. lithargyria* 1.—Major Still, Bridestowe.

ABERDEEN.—4th July, 1893.

Wood; wind E., light; sky obscured; dry. *Cæsiata*, *Immanata*, *Variata*, *Sociata*, *Pectinitaria*, *Montanata*, *Margaritata*, *Repandata*, and *Elutata*, were flying in great abundance in open places in the wood. At the side of a small brook I found *Munitata* and *Alchemillata* common. *Festiva* and *Porphyrea* were also common on heather bloom. I netted 1 *Interrogationis* and 1 *Pallens*. At sugar I took *Festiva* 14, *Tenebrosa* 5, *Lucipara* 1, *Oculea* 1, *Polyodon* 3, black form 1, *Fasciuncula* 3.—Arthur Horne, Aberdeen.

HIGHGATE, LONDON.—

Wood in a valley; wind E., fair breeze, but not felt in part where sugaring; sky clear, dry. The day had been sultry with a few drops of rain. The first insect came to sugar at 9-20, I left off at 10-45. Results: *A. psi* 1, *T. derasa* 1, *X. polyodon* 4, *scolopacina* 1, *M. strigilis* var. *æthiops* 6, *N. brunnea* 1, *T. pronuba* 2, *M. typica* 1, *N. augur* 2.—Dr. Buckell, 32, Canonbury Square.

BURGHEAD, MORAYSHIRE.—6th July, 1893.

Sandhills and moorland; no wind, cloudy, dry and very warm. *Dumetellus*, *Perlellus*, and var. *Warringtonellus*, and *Bilineata* flying in abundance among the bent grass, but apart from these I did not notice anything else. At sugar I took *Subsequa* 2, *Orbona* var. *Curtisii* 1, *Polyodon* abundant, dark and black vars. common. *Blanda* 1, *Valligera* 16, *Tritici* 4, *Cursoria* 1, *Pronuba* 6, *Porphyrea* 3, *Pallens* 5, *Adusta* 2, *Corticea* 3, *Festiva* 4, *Oculea* 3.—Arthur Horne, Aberdeen.

ISLE OF MAN.

Sugaring up to last night (July 6th) has been, here at all events, practically speaking a failure. In fact all through the month of June, insects at sugar have been conspicuous by their absence. About 9 p.m. last evening, a good breeze from the S.W. sprang up, and artificial sweets up to about 10-30 p.m. proved fairly attractive to the common species of Noctuæ. *X. polyodon* came in countless numbers, some forms being extremely dark, others light and intermediate, whilst *Oculea*, *Striglis*, *Pronuba*, *Orbona*, *Oleracea*, *Brassicæ*, *Lithoxylea*, *Putris* and *Exclamationis* all put in an appearance. The same trees have been sugared by me at Sulby every night for the past fortnight or so, without success until last night. Honey-suckle has been flourishing for the past month all over the North of the Island, and the insects seem to prefer the bloom of this plant rather than the treacle. I invariably notice that sugar is useless unless there is some breeze blowing, at least as far as my experience goes. Sugar on a calm, still night without some wind produces nothing.

To-night (6th July) I sugared in the grounds adjoining Sulby Parsonage. Wind S.W., strong breeze; sky obscured, dark clouds, but dry. Very warm, insects flying round trees in numbers. Honey-suckle flowers very attractive to *Plusias*. At sugar I saw *X. polyodon* quite 100, *H. oculea* 24, *M. strigilis* 3, *T. pronuba* 4, *orbona* 2, *H. oleracea* 16, *M. brassicæ* 8, *X. lithoxylea* 2, *N. putris* 1, *A. exclamationis* 4.—H. Shortridge Clarke, Douglas, Isle of Man.

ABERDEEN.—7th July, 1893.

Sand-hills at Old Aberdeen; wind E.; sky obscured; dry, but heavy dew on the grass. Noctuæ were flying abundantly but would not go freely to sugar. I captured *Pulchrina*, *Pallens*, *Exclamationis*, *Gemina*, *Arcuosa*, *Munitata*, *Ocellata*, *Badiana*, *Herbosana*, *Bertrami*, &c., I saw at sugar *Polyodon* common, *Fasciuncula* abundant, *C-nigrum* 1, *Oculea* 2, *Pallens* 2.—Arthur Horne, Aberdeen.

MARLBOROUGH.—7th July, 1893.

Oak wood, with birch, ash, beech, &c., cut this year; wind S., slight, cloudy at times, very dry. Insects were observed coming to the sugar and then flying away again after taking very little. Results: *T. pronuba* 3, *A. tritici* 1, *exclamationis* 1, *ravida* 1, *M. strigilis* 4, *C. trapezina* 4, *L. pallens* 2, *N. baja* 1.—H. S. May, The Green, Marlborough.

London, N.E.—10th July, 1893.

A broad ride bordering a well timbered park; wind S.S.W., strong, falling about 9; sky obscured; rather damp. Just the sort of night one would expect to be good for sugaring, dark and moderately warm, after stormy weather. Wasps swarming at the sugar before dusk. At sugar I found *T. derasa* several, *L. lithargyria* rather common, *X. polyodon* common, often 6 or 8 at a batch, *lithoxylea* 1, *D. pinastri* 1, *M. brassicæ* 4 or 5, *A. oculea* rather common, *Ophiogramma* 1, *M. strigilis* a few worn, *arcuosa* 1, *C. blanda* 6, *A. nigricans* 2, *T. pronuba* rather common, *orbona* 1, *N. augur* 4 or 5 worn, *triangulum* 2, *brunnea* 2, *A. tragopogonis* 2, *C. trapezina* common, *affinis* 4, *H. oleracea* 1, *M. typica* several, *H. proboscidalis* 1, *grisealis* 1. *A. pyramidea* was also taken drying its wings on a tree trunk about 9-30 p.m.—Louis B. Prout, Dalston, London, N.E.

Banffshire.—11th July, 1893.

Banks of Avon at Ballindalloch; wind S.E., very light; cloudy; dry. Geometers were plentiful, I captured *Rubiginata*, *Papilionaria*, *Simulata*, *Munitata*, *Mensuraria*, *Margaritata*, *Ruberata*, *Immanata*, *Didymata*, *Fulvata*, and *Populata*. Saw *Graminis* and *Baja* on ragwort flowers. At sugar were *Polyodon* 6, *Augur* 11, *Festiva* 5, *Fasciucula* 2.—A. Horne, Aberdeen.

Hastings.—11th July, 1893.

Wood, mostly oak, a few birches and sallows; wind S.E., very slight; sky very clear, but damp with heavy dew. I only sugared a dozen oaks about 8-30 p.m. I stayed until 10 p.m., and found *A. rumicis* 1, *X. polyodon*, a few.—A. Ford, Hastings.

Marlborough.—12th July, 1893.

Wood; wind N., slight; cloudy; very damp. There had been showers in the morning, and a heavy thunderstorm in the afternoon. Results at sugar: *A. nigricans* 4, *C. trapezina* 11, *T. pronuba* 6, *M. typica* 1, *L. pallens* 2, *impura* 2, *lithargyria* 8, *X. polyodon* 4, *A. pydramidea* 1, *M. strigilis* 4, *A. oculea* 4, *X. sublustris* 1, *C. blanda* 1, *A. exclamationis* 1.—H. S. May, Marlborough.

Wimbledon.—12th July, 1893.

Wood on Wimbledon Common; Wind N.N.W., fresh; cloudy; damp and showery. Plenty of Noctuæ were flying about after dark, but they did not seem much attracted by the sugar, much more so by the lamp. At sugar there were a few only of *Baja*, *Pronuba*, *Polyodon*, *Affinis*, *Trapezina*, and *Brassicæ*.—E. H. Taylor, Fulham.

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ADVERTISEMENTS.

The Editor regrets that, owing to his illness, the Magazine is rather late in appearing. He also begs his correspondents to excuse him for a few days from replying to their communications.

EXCHANGE.

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TO CORRESPONDENTS.

A considerable number of communications are unavoidably held over for want of space.

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LONDON, N.—12th July, 1893.

In the ride of a wood; wind N.W., light; sky thinly obscured; damp, rain during day with thunder, shower while sugaring. First insect on sugar at 9 p.m., left off at 11. A great sugar night, the species against which there is no number appeared in swarms. Results: *T. derasa* 2, *A. psi* 1, *L. impura* 3, *X. lithoxylea* 2, *polyodon*, *M. brassicæ* 1, *A. oculea*, *M. strigilis*, *N. augur* 2, *T. pronuba*, *M. typica* 6, *C. trapezina*, *E. lucipara* 2, *H. oleracea* 4, *T. grisealis* 1.—Dr. Buckell, Canonbury Square.

BRIDESTOWE, DEVON.—14th July, 1893.

Trees near wood; wind N.W.; sky obscured; dry; hardly any wind, weather dull and rather cold. At sugar were numbers of *X. polyodon* and *A. oculea*, but nothing else.—Major Still, Bridestowe.

ABERDEENSHIRE.—15th July, 1893.

Wood at Moneymusk; wind S.W.; cloudy; slight showers occasionally. I captured at dusk 3 *Myellus*, *Minutata*, *Prunata*, *Cæsiata*, *Populata*, &c. At heather bloom and on flowers I got a few *Sobrina*, *Umbrosa*, *Conigera*, *Arcuosa*, *Interrogationis*, *Impura*, *Pallens*, *Pronuba*, *Festiva*, &c. At sugar *Polyodon* abundant, *Festiva* common, *Baja* 10, *Brunnea* 7, *Oculea* 2, *Augur* 1, *Pronuba* 1.—A. Horne, Aberdeen.

MARLBOROUGH.—15th July, 1893.

Wood; wind E., slight; rather cloudy; dry; cold. Results: *A. ligustri* 1, *L. pallens* 3, *impura* 3, *lithargyria* 4, *A. nigricans* 1, *exclamationis* 1, *C. trapezina* 5, *A. pyramidea* 4, *tragopogonis* 1, *A. oculea* 1, *A. lucipara* 1, *T. fimbria* 1, *X. lithoxylea* 4, *polyodon*, *T. pronuba* and *M. strigilis* numerous. —H. S. May, Marlborough.

BRIDESTOWE, DEVON.—15th July, 1893.

Near wood; wind none; starlight; dry; on many such nights I have seen moths swarming at sugar, but this night I never saw a moth of any species.—Major Still, Devon.

MARLBOROUGH.—17th July, 1893.

Oak wood, underwood of one or two years growth; wind N.W., moderately strong; clear sky, starlight; dry; cold. The insects were found in batches at intervals, the intermediate trees being without any. Results: *L. impura* 3, *lithargyria* 1, *A. nigricans* 7, *C. trapezina* 4, *A. pyramidea* 3, *tragopogonis* 1, *X. lithoxylea* 8, *N. baja* 3, *C. cytherea* 1, *N. depuncta* 1, *T. pronuba*, *P. polyodon*, *L. pallens*, *A. oculea*, and *M. strigilis*, all numerous.—H. S. May, Marlborough.

BRIDESTOWE, DEVON.—17th July, 1893.

Near wood; hardly any wind; sky obscured, rather damp. Several species were numerous and I saw more insects than any night this year. There was a heavy dew, but it was a warm night. At sugar were numerous examples of *X. polyodon*, *A. oculea*, *A. rumicis*, *T. orbona*, *pronuba*, *A. pyramidea*, *L. conigera*, *lithargyria*.—Major Still, Bridestowe.

GIRDENESS, KINCARDINESHIRE.—19th July, 1893.

Coast; wind E., moderate; cloudy; heavy showers occasionally. *Lucernea* and *Conigera* were common on heather bloom. At sugar were *Furva* 9, *Rurea* 2, *Gemina* (worn) 3, *Polyodon* abundant, dark and black vars. common, *Conigera* 3, *Oculea* common, *Pronuba* common, *Literosa* 1, *C-nigrum* 1, *Orbona* 1, *Impura* 2, *Pallens* 1, *Suffusa* (worn) 3.—A. Horne, Aberdeen.

SANDOWN, ISLE OF WIGHT.—17th July, 1893.

Chalk Downs; wind W.N.W., rather strong; clear; moderately dry. Sugar spread on posts supporting a wire fence, and on flowers. On posts only were one each of *L. pallens*, *A. suffusa*, and *segetum*. On both posts and sugared flowers were numerous examples of *X. polyodon*, *A. oculea*, *M. furuncula*, *literosa*, *O. puta*, *C. blanda*, *A. nigricans*, and four *A. lunigera*. On sugared flowers were *L. conigera* 5, *lithargyria* 2, *A. tritici* 3, *T. pronnba* 2, *P. gamma* 2, *H. chenopodii* 1. On unsugared flowers I only saw *C. blanda*, *cubicularis* 1, and *A. nigricans*, all at Marjoram.—L. B. Prout, London.

ABERDEEN.—20th July, 1893.

Wood with undergrowth of bilberry and heather; strong Southerly gale; cloudy; showers throughout the evening, clearing up about sugaring time. I got 1 *Myellus* and 3 *Sobrina* on flowers in a sheltered part of the wood. This was my best night at sugar this season in point of numbers and about the worst for quality. At sugar were *Polyodon*, *Festiva*, *Pronuba*, abundant, *Baja*, *Oculea*, *Pallens*, *Impura*, common, *Suspecta* 4, *Rurea* 2, *Conigera* 1, *Umbrosa* 3, *Brunnea* 2.—Arthur Horne, Aberdeen.

WOODSTOCK, OXFORD.—20th July, 1893.

Side of wood bordering stream; wind, S., very slight; clear; moonlight at first, cloudy about 10 p.m.; damp, rain all previous night. Very few insects about. Temperature 59°. At sugar were *A. megacephala* 1, *T. pronuba* 3, *A. pyramidea* 1, *M. typica* 1.—J. H. D. Beales, Woodstock.

SANDOWN, ISLE OF WIGHT.—20th July, 1893.

Chalk Downs; wind W., light; obscured; damp. I sugared posts supporting a wire fence, and flowers. There had been much rain in the morning and flowers and grass still retained a great deal of moisture. On sugared flowers I took *L. conigera*, a few, *L. lithargyria*, a few, *C. cubicularis* 2, *A. segetum* 1, *A. tritici* 2, *A. lunigera* 4, *N. c-nigrum*

1, *T. orbona* 3, *pronuba*, a few, *H. chenopodii* 1, *P. gamma* 1. On fence only—*A. tragopogonis* 1, *A. suffusa* 2, *H. suasa* 1. At both flowers and fence *C. blanda*, several (majority at flowers), *A. puta*, common (large majority on fence), *A. nigricans*, common (large majority at flowers), *X. polyodon*, a few, *E. punctaria*, several, only one on fence, *A. oculea*, rather common, *M. literosa* and *furuncula*, a few.—L. B. Prout, London.

MARLBOROUGH.—20th July, 1893.

Oak wood, undergrowth one year old; wind W., but changeable, slight; rather cloudy, moonlight, rain for 24 hours previously. Results: *M. brassicæ* 1, *N. depuncta* 5, *T. fimbria* 1, *N. triangulum* 1, *M. strigilis* 1, *A. tragopogonis* 2, *A. nigricans* 14, *G. libatrix* 1, *C. blanda* 1. The following were all numerous, *C. trapezina*, *T. pronuba*, *A. oculea*, *L. pallens*, *impura*, *X. polyodon*. Total number observed 122.—H. S. May, Marlborough.

SANDOWN, ISLE OF WIGHT.—21st July, 1893.

Chalk Downs; wind S. to S.W., moderate, but rather cold; sky much obscured, dry. Sugared posts and flowers as before. The comparative failure of sugar is no doubt due in part to rise of wind and fall of temperature at sunset. Certainly in part to it having been spread in places too exposed, the wind increasing after it was on. Thus only on the most sheltered flowers there were any insects at all, and the fences were almost useless. The few things recorded there being mostly at the drops which had fallen on the grass below. At sugared flowers I took *L. lithargyria* 1, *C. blanda*, 3 or 4, *A. lunigera* 1, *tritici* 1, *T. pronuba* 6 or 8. At both flowers and fences *M. furuncula* 12, *literosa* 2, *A. puta*, 1 on fence 3 on flowers, *suffusa* 2, *nigricans* 1 on fence, 5 at flowers, *T. orbona*, 1 at fence 3 at flowers, *A. oculea*, a few.—L. B. Prout, London.

MARLBOROUGH.—21st July, 1893.

Wood; wind S.W., slight; cloudy and very wet. At sugar I took *N. depuncta* 4, *T. fimbria* 5, *N. triangulum* 2, *A. nigricans* 12, *tragopogonis* 3, *C. blanda* 1, *M. strigilis* 4, *X. polyodon* 8, *L. pallens* 1, *A. pyramidea* 2, *rumicis* 1, *psi* 1, *N. baja* 4, *A. suffusa* 1, *M. brassicæ* 2, *X. lithoxylea* 1, *A. oculea*, *C. trapezina* and *T. pronuba*, numerous. Total number of insects observed 148.—H. S. May, Marlborough.

BAY OF NIGG, KINCARDINESHIRE.—22nd July, 1893.

Coast; wind S.W., moderate; clear, dry, and cold; a little frosty *Lucernea* was common at the heather bloom. At sugar were *Furva* 14 *Umbrosa* 1, *Literosa* 1, *Festiva* and *Oculea* common, *Polyodon* abundant.—Arthur Horne, Aberdeen.

MARLBOROUGH.—22nd July, 1893.

Wood; wind W., moderate; rather cloudy; moonlight at times; slightly damp. At sugar: *N. depuncta* 10, *triangulum* 2, *baja* 2, *T. fim-*

bria 1, *orbona* 1, *A. nigricans* 7, *tragopogonis* 2, *C. blanda* 4, *M. strigilis* 3, *L. pallens* 2, *impura* 1, *X. lithoxylea* 1, *M. brassicæ* 2, *X. polyodon*, *T. pronuba*, *A. oculea*, *C. trapezina*, numerous. Total number of insects observed 140.—H. S. May, Marlborough.

SANDOWN, ISLE OF WIGHT.—22nd July, 1893.

Chalkdowns; wind N.W., moderate; clear, dry, rather cold. As before I sugared posts and flowers. At sugar only I found *L. conigera* 2 or 3, *C. cubicularis* 2, *A. exclamationis* 1. At posts only: *M. literosa* 2, *A. suffusa* 1, *T. fimbria* 1, *C. sponsa* 1, *A. tragopogonis* rather common. At both posts and flowers were *L. lithargyria* 7, *X. polyodon* several, *A. oculea* very common, *M. furuncula* common, *C. blanda* several, *A. puta* very common, *segetum* 2, *lunigera* 2, *nigricans* very common, *exclamationis* 1, *tritici* 5, *T. pronuba* and *orbona* common.—L. B. Prout, London.

MARLBOROUGH.—24th July, 1893.

Wood; wind W.N.W., rather strong; cloudy, but dry; previous day wet. *N. depuncta* 11, *baja* 7, *T. fimbria* 5, *orbona* 1, *pronuba* numerous, *A. nigricans* 12, *suffusa* 1, *A. tragopogonis* 5, *pyramidea* 1, *L. pallens* 2, *impura* 3, *lithargyria* numerous, *X. lithoxylea* 2, *polyodon* numerous, *C. blanda* 2, *trapezina*, *A. oculea* and *M. strigilis* all numerous. Total number observed 178.—H. S. May, Marlborough.

ISLE OF WIGHT.—25th July, 1893.

Brading Marshes, and a copse on its borders; wind S.W., very strong, moderating about 9; clear and dry. I sugared a miscellaneous round of posts, trees, flowers, and leaves, all of which produced some results, detailed in the classification below, as they may be of value at some time. Everywhere, *A. oculea*, common on every patch. Bramble flowers and posts, *L. lithargyria* 3, *nictitans* 2, *T. janthania* 1. Flowers, *C. blanda* 2, *A. nigricans* 1. Leaves (Hazel and Sallow), *G. libatrix* 2. Leaves and tree trunks, *C. affinis* 2, *trapezina* 3 or 4. Trees, *T. pronuba* 3, *X. polyodon* 1, *T. derasa* 1, *N. baja* 1, *M. brassicæ* 1. Posts, *A. tritici* 2, *putris* 1. Flowers and Sallow, *A. tragopogonis* 2. Except two species everything came in with a rush at 9 o'clock. It is also curious that with such a variety of species, everything only occurred singly except *oculea*.—L. B. Prout, London.

WIMBLEDON.—26th July, 1893.

Wood on Wimbledon Common; wind N.E., light; clear, fairly dry, warm. Nothing flying before dusk, but sugar proved exceedingly attractive. *Pronuba*, *Oculea*, *Baja*, *Trapezina*, in swarms, *Nupta* 2, *Cytherea* 1, *N. rubi* 2, *Pyramidea* several, *Puta* 1, *M. brassicæ* several, *Polyodon* many, *Impura* a few. A few *micros* also.—E. H. Taylor, Fulham.

Sandown, Isle of Wight.—26th July, 1893.

Chalk Down; wind N., moderate; sky obscured at first, bright moonlight soon after 9; dry. Sugared posts and flowers. A really prolific night, frequently 20 or 30 moths at a patch, posts perhaps more favoured than flowers, but both productive. Results: *L. conigera* 1, *lithargyria* 4 or 5, *Polyodon* 3, *C. blanda* several, *cubicularis* 2, *A. oculea* abundant, *M. furuncula* very common, *literosa* 8, *A. puta* abundant, *suffusa* 1, *segetum* 4, *lunigera* 1, *exclamationis* 2, *tritici* 5, *nigricans* very common, *N. c-nigrum* 2, *T. fimbria* 1, *pronuba* a few, *janthina* 1, *M. brassicæ* 1, *H. chenopodii* 1, *A. tragopogonis* rather common, *A promutata* 1, (at sugared flowers).—L. B. Prout, London.

Marlborough.—27th July, 1893.

Wood; wind E., very slight; clear, dry. At sugar: *T. fimbria* 4, *pronuba* numerous, *orbona* 2, *N. depuncta* 2, *baja* 7, *A. tragopogonis* 2, *L. lithargyria* 5, *pallens* 3, *C. blanda* 1, *M. strigilis* 2, *A. nigricans* 5, *A. oculea* 5, *X. polyodon* 5, *lithoxylea* and *C. trapezina* numerous.—H. S. May, Marlborough.

Sandown, Isle of Wight.—27th July, 1893.

Chalk Down; wind, N., very light, almost a calm, breeze from E. springing up about 10. Overcast until 10, moon then breaking through; dry. Sugared posts and flowers as usual. The connection of weather with the flight of insects was very noticeable to-night. They were coming freely to the sugar till 10 when the wind changed, and there were very few after that. At sugar: *L. conigera* 2, *lithargyria* several, *X. polyodon* a few, *A. oculea* abundant, *M. furuncula* very common, *literosa* 4 or 5, *C. blanda* several, *cubicularis* several, *A. puta* abundant, *suffusa* 2, *segetum* 4, *lunigera* 2, *exclamationis* 1, *tritici* 3, *nigricans* abundant, *T. pronuba* a few, *orbona* very common, *janthina* 1, *N. rubi* 1, *baja* 2, *C. trapezina* several, *H. chenopodii* 1, *A. tragopogonis* common, *E. pumilata* 1.—L. B. Prout, London.

Kindcardineshire.—28th July, 1893.

Coast at Bay of Nigg; wind W., moderate; cloudy, dry. I got 15 *Lucernea* on heather bloom, and one on ragwort. At sugar were *Fibrosa* 1, *Furva* 6, *Orbona* 3, *Conigera* common, *Festiva* common, *Nigricans* 6, *Literosa* 1, *Pallens* 3, *Lithargyria* 2, *Oculea*, *Polyodon*, and *Pronuba* abundant.—Arthur Horne, Aberdeen.

Marlborough.—28th July, 1893.

Wood; wind N.W., very slight; cloudy, dry, and very warm; heavy dew. At sugar: *N. depuncta* 1, *baja* 3, *T. fimbria* 2, *orbona* 1, *A. pyramidea* 4, *A. nigricans* 5, *ravida* 1, *L. pallens* 3, *impura* 1, *lithargyria* 5, X. *polyodon* 5, *C. blanda* 1, *M. strigilis* 1, *T. pronuba*, *C. trapezina*, *A.*

tragopogonis, and *A. oculea*, all numerous. Total number observed 86. —H. S. May, Marlborough.

SANDOWN, ISLE OF WIGHT.—28th July, 1893.

Chalk Downs; wind S.W. to W. light; sky obscured to some extent, but the night light, the moon being just past full; dry. I sugared posts only. A much less productive night than the two preceding, perhaps on account of its turning suddenly colder just at sunset. *L. lithargyria* 6 or 8, *A. oculea* fairly common, *M. furuncula* several, *literosa* 3 or 4, *C. cubicularis* 6, *blanda* 3, *A. puta* common, *suffusa* 1, *segetum* 4, *lunigera* 3, *tritici* 2, *nigricans* common, *T. pronuba* 2, *orbona* common, *A. tragopogonis* a few, *C. trapezina* 1.—L. B. Prout, London.

KINCARDINESHIRE.—29th July, 1893.

Bay of Nigg; wind N.W., moderate; sky obscured; heavy showers throughout the evening. The rain completely spoiled the heather bloom and ragwort. At sugar were: *Furva* 22, *Xanthographa*, *Conigera*, and *Pronuba* common, *Polyodon* and *Oculea* abundant, *Nigricans* 4, *Literosa* 4, *Fasciuncula* 2, *Orbona* 4, *Lithargyria* 2, *Pallens* 2, *Tritici* 1.—Arthur Horne, Aberdeen.

SANDOWN, ISLE OF WIGHT.—31st July, 1893.

Chalk Down; wind N.W., rather strong; clear, dry. Only posts Sugared. A cold dry night, when a failure at sugar might have been expected. Still a good many Geometers, &c., were observed flying in sheltered places, and, as the event proved, the failure at sugar was not complete. Results: *L. lithargyria* 3, *polyodon* 1, *M. brassicæ* 3, *A. oculea* rather common, *M furuncula* several, *literosa* 3, *C. cubicularis* 2, *blanda* 2, *A. puta* common, *suffusa* 4, *saucia* 1, *segetum* about a dozen, *nigricans* fairly common, *exclamationis* 1, *T. pronuba* 2, *orbona* rather common, *N. c-nigrum* 1, *H. chenopodii* 1, *A. tragopogonis* 6.—L. B. Prout, London.

THE PTEROPHORINA OF BRITAIN.

BY J. W. TUTT, F.E.S.

(Continued from p. 117.)

Pselnophorus, Wallgrn.

The genus *Pselnophorus* was described by Wallengren for the reception of *brachydactyla*, Tr. The following is his diagnosis of the genus:—" Antennæ tantum maris brevissime ciliatæ; articulus earum basalis haud longiores, graciles, cylindrici. Tibiæ omnes graciles; calcaria tibiarum posticarum longitudine fere æqualia. Alæ ant.

costas gerentes, in quiete alas post. occultantes, margine interiore deflexo et circumflexo atque digito posteriore eas amplectentes; digiti graciles, angulo anali carentes; cellula discoidalis indistincta et aperta. Digiti al. post. graciles; digitus tertius fimbriis marginis interioris mediocribus; costæ 6; cellula discoidalis indistincta. Sp. Scand. *brachydactylus*, Treitsche" ("Entomologisk Tidskrift," Vol. II., p. 96). Mr. Meyrick seems to have been unaware of the existence of this genus for he places *brachydactyla* and *amurensis* under a genus newly described by himself and called *Crasimetis* ("Trans. Ent. Soc. of London," 1890, p. 489). This genus of course cannot stand. He adds regarding these two species:—"I know only the two following species *(brachydactyla* and *amurensis)*, of which one is European, the other East Siberian. It is an interesting genus, as being obviously the ancestral form of Pterophorus" *(l.c.)*. Mr. Meyrick, unfortunately, gives us no reasons for this supposition nor any idea as to how he arrives at such an important conclusion.

P. brachydactyla.—This is decidedly, next to *Oxyptilus hieracii*, the rarest British plume. There has been considerable doubt about its being really a British species, and I must confess that I often used to feel a mild doubt myself whether the four or five recorded specimens were in reality this or forms of some other British species. Since, however, the specimen in the possession of Mr. Weir and the second (supposed to be in the Rev. Mr. Burney's collection) were both submitted to Mr. Stainton, there should be no doubt about their identity with the species in question.

SYNONYMY—*Brachydactyla*, Tr., IX., 2, 238; Zell., 'Isis,' 1841, 856, T. 4, 34; 'Linn. Ent.', VI., 389; H.-S., 11, V., p. 381; Frey, 417; Sta., 'Manual,' II., p. 444. *Ætodactylus*, Dup., XI., 313, 8.

Var. *poggei*, Mann, 'Wien. Ent. Mts.', 1862, 409, T. 3, 16.

IMAGO—Treitschke's original description of this species is as follows:—"*Alucita brachydactyla.* Alis anticis nigro-brunneis, maculis marginalibus albis" ("Die Schmett." &c., pp. 238-239), to which he further adds:—"My friend Herr Kollar has furnished in the above a systematic list of the lepidoptera of Austria proper, and first made known this species, which is found here sparingly as well as in Saxony, where it occurs in the so-called Amselgrunde, a deep rocky valley of Saxon Switzerland. Herr Kollar's specimen, which was a male, was rather faded, mine is a female and differs somewhat from the description of the former. In size it is similar to *didactyla*, perhaps slightly larger. The whole body is black-brown; the antennæ black, with minute white rings; at the beginning of the abdomen is a light (white) band; the feet are very distinctly white and black. The forewings are short, divided into two lobes, black-brown in colour, with a few, more or less distinctly marked, white spots, of which the two larger extend over the commencement of the fissure, extending to the fringes on the inner margin; on the lower lobe are two other white spots. The hind-wings are somewhat lighter brown, their fringes almost grey; they are divided into three plumules by two fissures, the upper cleft reaching only half way up the wing. On the undersides, there are several white spots on the blackish-brown ground colour and on the fringes. The moth was taken in the month of June in the bushes on the Anninger near Mödling" *(l.c.)*. Stainton's diagnosis of this species is as follows:—"9‴—9½‴. Fore-wings dark brown, with the costa and fringes spotted with white; hind-wings dark brown, with a white blotch in the fringes of the second feather. VII." ("Manual," II., p. 444). The following description was made by Mr. South from a foreign specimen:—"Imago—Expanse, 10—11½ lines. Fore-wings black, sprinkled with ochreous-brown scales, especially on the disc, which seems in consequence to be of a brownish-black coloration; a small white dot on the costa above the digital juncture, from which an ochreous line, sharply angulated at the juncture, runs to the inner margin; fringes black, ornamented with white at the tip of the outer and the angle of the inner digit; there are also some white scales edging the digital juncture, and a patch of white scales on the fringes of the inner margin at the termination of the ochreous transverse line. Hind-wings blackish-brown; fringes of second feather grey from the base to the middle, and white near the tip; there are also some white scales at the junction of the first and second feathers. Head and thorax the colour of the fore-wings. Abdomen brown, ornamented with lateral white spots. Legs brown, the tibiæ with one, and the tarsi with four white marks or rings" ("Entomologist," Vol. XXII., p. 36).

LARVA—Of the larva of this species Dr. Jordan writes:—"In June 1856, I received through the kindness of Mr. Stainton (who had them from Professor Zeller of Zurich), two larvæ of *Pterophorus brachydactylus;* they were found on *Prenanthes purpurea*, but whilst in my possession they ate *Lactuca muralis* freely, feeding on the upper surface of the leaf, and living on it without any attempt at concealment. The larvæ were narrowly fusiform in shape, not flattened from above downwards, and with sixteen feet, the two segments which followed the three pairs of true legs having, however, prominences beneath. The head was yellowish-brown; the body green, with the dorsal line of a darker green colour; the sub-dorsal line was also dark green, but so wavy as almost to present the appearance of separate spots upon each segment; the spiracles were black. There were two rows of lateral tubercles, each of which had a few dusky grey hairs springing from it. Neither of the larvæ were reared; when apparently full-fed they became stationary, without forming any silken fastening, and in a few days a cocoon of one of the *Muscidæ* emerged from each larva. The small flies reared from these apparently belonged to genus *Musca* or *Anthomyia (Tachina?* Eds.)" ("Entomologist's Monthly Magazine," Vol. I., p. 215). Stainton writes of the larvæ:—"Professor Frey finds the larva of this (with us great rarity) on the underside of the leaves of *Prenanthes purpurea*, in fir woods in May; that plant is not British, but is not unfrequently found in woods escaped from cultivation" ("Entomologist's Annual," 1856, p. 60). Frey's description as quoted in Leech's "British Pyralides" is as follows:—"The ground colour of the larva is pale dirty green; dorsal stripe darker, on each side of which is a row of tubercles bearing dark bristles, followed by another row bearing one dark bristle and a few small hairs; a third row occurs lower down, crowned with white bristles" ("British Pyralides," p. 66).

Parasites—Of the parasites infesting the larvæ of this species Dr. Jordan writes:—"Parasites are certainly rare on the larvæ of this group of Lepidoptera; an ichneumon has been, however, figured and described by M. Millière and it has been my misfortune four times to have larvæ so infested. Twice the parasitism occurred in the larvæ of *brachydactvlus* sent to me from Zurich as noted in the "Entomologist's Monthly Magazine," Vol. I., p. 215. The Dipteron there recorded as one of the *Tachinidæ*, has been kindly sent by Mr. McLachlan to Mr. Verrall, and decided by him to be a *Scoplia*, probably *S. oxypterina*, Zetterstedt. Again this spring, two larvæ of *tephradactylus* were infested, but the evil spirits which haunted them were in this case ichneumons. They were regarded by me as the sexes of one species, but they have been named by Mr. Marshall *Rogas bicolor*, Spinola, and *Mesochorus pectoralis*, Ratzeburg; both larvæ, as in the former case, had only a single tenant each, and, in the case of the *brachydactylus*, they became stationary just before their time of change, and when dead, seemed to consist of a dry larval skin enclosing the parasite and in the case of *brachydactylus*, its cocoon also" ("Entomologist's Monthly Magazine," Vol. VI., p. 138).

Habitat—Stainton says "Once in Norfolk" ("Manual," II., p. 444), and, the specimen on which this reference is based, is now in the possession of Mr. J. Jenner Weir, who, referring to a note of mine in which I said "the right of this species to be considered as British has frequently been questioned," writes as follows:—"In your excellent paper on "The Pterophorina" ("Entomologist's Record," Vol. III., p. 33), you appear to throw a doubt on the right of *Pselnophorus brachydactvla* to be considered as a British species. You may, perhaps, not be aware that I possess, and have had for about forty years, the first specimen of this species recorded as taken in England. This was captured in Norfolk, a fact that was at the time well known to Stainton. I had it placed in my hands at the time by a friend of mine, who was, I believe, the captor. His name was Farr. He died, and it has been with me ever since" (Entomologist's Record," &c., Vol. III., p. 63), whilst at the same time Mr. J. B. Hodgkinson wrote :—" I believe the first specimen of *Pselnophorus brachydactyla* that was captured in England to be in the possession of Mr. Jenner Weir. The second specimen was taken at Carlisle by a local collector from whom I bought it for twopence, with a number of *Platyptilia pallidactyla*. It was sent on to Stainton to be named, and is now, I believe, in the Rev. Henry Burney's collection" *(l.c.)*. Dr. F. Buchanan White gives us the following records of the species. He writes :—" With regard to the notes on this species (" Entomologist's Record," III., pp. 33 and 63), *vide* " Scottish Naturalist," IV., p. 246, 1877-78, where I record the capture of two specimens near the mouth of Glen Tilt, Perthshire. One was taken by the late Sir T. Moncreiffe (see " Scottish Naturalist," Vol. II., p. 203), and is, I suppose, still in his collection. I think the other was taken by Mr. W. Herd, who has probably still got it. There is no doubt about the species, but I did not know that it was quite so rare" (" Entomologist's Record," &c., Vol. III., p. 114). Wocke gives the following as its area of distribution :— " Sweden, Germany, Switzerland, Hungary, England, France and Central Italy," whilst for var. *poggei* he gives :—" Bithynia and the Crimea" (" Catalog," p. 344).

BEMBIDIUM IRICOLOR, BEDEL.

A SPECIES NEW TO THE BRITISH LIST.

BY E. A. NEWBERY.

(Read at the City of London Entomological and Natural History Society, Oct. 17, 1893.)

Bembidium biguttatum and its allies have always been puzzling species to the student of British Coleoptera, and it is perhaps for that reason that so conspicuous an insect as *Bembidium iricolor*, Bedel (described as a new species in 1879), has so long been omitted from the British list, although the insect itself is so well known to most of our coleopterists.

Having lately had occasion to examine a large number of specimens belonging to this group, I found that there were three distinct forms which possessed characteristics of sufficient importance to entitle them to rank as species, and upon referring to Bedel's " Coléoptères du bassin de la Seine," I found therein a diagnosis of each of the forms in question, that of *B. iricolor* appearing to agree with our omitted species.

The following table, adapted from Bedel, will serve to separate our three species :—

A.—Elytra with the seventh stria indicated by a row of 8 or 9 punctures . . . . . *B. biguttatum*, F.

B.—Elytra with the seventh stria wanting.

1. Size larger (4 to 5 mill.) ; joints 3 to 10 of antennæ three times as long as broad ; punctation of basal half of elytra less strong . . *B. iricolor*, Bedel.
2. Size smaller (3½ mill.) ; joints 3 to 10 of antennæ at most two and a half times as long as broad ; punctation of basal half of elytra stronger *B. lunulatum*, Fourc.

The synonymy of these insects, as regards English and French authors, appears to be the following :—

B. BIGUTTATUM, F. (1779).
= *B. biguttatum*, Fowler, Brit. Col.
,, Cox, Handbook.
,, var. B, Dawson, Geodeph. Brit.
,, v. B, Fairmaire et Lab. Fa. Ent. Fr.
= *vulneratum*, Dej.
B. IRICOLOR, Bedel (1879), Fa. Col. Seine. I., p. 35.
= *B. riparium*, Fowler, Brit. Col.
B. LUNULATUM, Fourc. (1785).
= *B. riparium*, Ol., et auct.
,, Cox, Manual.
= *B. biguttatum*, Dawson, Geodeph. Brit.
,, Fairmaire et. Lab. Fa. Ent. Fr.

Bembidium biguttatum, F., may be readily known by the presence of the seventh stria of the elytra. The first joint of the antennæ and the legs are usually of a clearer red, and the sub-apical spots better defined, than in its allies. In size it is intermediate between the two other species (3½ to 4 mill.). It is common, though less so than *B. lunulatum*.

B. iricolor, Bedel, is the largest species of the group, and is often of a pitchy colour, though, like the others, iridescent in a strong light. The sub-apical spots are much less distinct than in *B. biguttatum* and are often diffused over the entire apex. The total absence of the seventh stria of the elytra will at once separate it from *B. biguttatum*, and its larger size, finer punctation, longer intermediate joints of the antennæ, and flatter and broader interstices of the elytra, will separate it from *B. lunulatum*. I have only seen specimens which have been taken near brackish water, and this agrees with Bedel's habitat for the insect. I have captured it at Charlton and Southsea ; Mr. Heasler has taken it at Plaistow, Plumstead, Rainham and Sheerness ; and Mr. Lewcock also has taken it at Rainham, Essex.

B. lunulatum, Fourc., is the smallest and most abundant of the three, and is usually of a blacker colour than either of the other species; it has the punctured striæ more conspicuous and the interstices more convex. It is often found in much drier places than its allies, and is common everywhere.

I ought to mention that Bedel states that in *B. iricolor* the internal striæ are indicated to the apex of the elytra and that they are obsolete at apex in *B. lunulatum*. As the striæ do not appear to be constant in this particular in either species I am not disposed to place much reliance on this distinction, the comparatively broad interstices of *B. iricolor* being, in my opinion, a much better character, judging from the specimens before me.

12, Churchill Road, Dartmouth Park, London, N.W., October 2, 1893.

[It is highly probable that the foregoing three species will be found mixed up in most of the British collections; and, as the nomenclature appears to be in a very confused state, it will be as well to adopt the names laid down by Mr. Newbery in the above table. With regard to the term *lunulatum* (Fourc.), I see no reason for objecting to its adoption, as it cannot possibly be confounded with *B. lunatum*, Duft. —G.A.L.]

THE MOLLUSCA OF NOTTINGHAMSHIRE.

BY W. A. GAIN.

(Continued from page 139.)

TERRESTRIAL.

Order PULMONATA.

Family ARIONIDÆ.

GENUS ARION, Fer.

Arion empiricorum, Fer. (=*A. ater*, Aucc.)—Found everywhere.

Vars. *rufa*, L., *brunnea*, Rbk., and *rubra*, Moq.—These varieties are common, I have recently found an example under a log in a wood at Ossington, which I could not distinguish from an example of *A. rufus* sent to me from France.

Var. *bicolor*, Rbk.—I have taken this variety at East Markham.

Var. *plumbea*, Rbk.—I have found an example which appears to belong to this variety.

Var. *cinerea*, Rbk.—Probably=var. *cinerascens*, Ckll.—Corporation Gardens, Nottingham, Dodd.

Var. *pallescens*, Moq.—Corporation Gardens, Nottingham, Dodd.

Arion hortensis, Fer.—Far too common.

Var. *subfusca*, Pfr.—Occurs with the type.

Var. *nigra*, Moq.—Not rare around Tuxford.

Arion intermedius, Norm. (=*A. minimus*, Simroth, =*A. flavus*, Jeff.) Occurs in several localities among dead leaves in woods.

Arion circumscriptus, Johnst. (=*A. fasciatus*, Nils.=*A. bourguinati*, Mab.) Plentiful in gardens and fields in Tuxford and neighbourhood.

Arion celticus, Poll. Perhaps a variety of *A. hortensis*. A slug which I sent to Mr. Collinge, of Birmingham, last year was identified by him as belonging to this form. This, he tells me, was the second record for Great Britain.

Arion lusitanicus, Mabille.—Perhaps a variety of *A. empiricorum*. A slug sent by me, from Ossington, to Mr. Collinge was considered by him as probably belonging to this form, future dissection will, perhaps, determine this point.

Family LIMACIDÆ.

GENUS AMALIA, Moq.

Amalia gagates, Drap.—Occurs in gardens at Tuxford. Examples which I sent some years ago to Mr. Taylor, of Leeds, were said by him to be the first recorded from a British inland county. All the examples known belong to the var. *plumbea*, Moq.

GENUS LIMAX, L.

Limax maximus, L.—Generally distributed and common.

Var. *cellaria*, D'Arg.—I have this form in my garden.

Var. *fasciata*, Moq.—Corporation Gardens, Nottingham, Dodd.

Var. *cinerea*, Moq.—Tuxford.

Var. *mulleri*, Moq.—Mapperly, Musson.

Var. —— .—A few days ago an example was caught in my yard which I can refer to no variety known to me, unfortunately, having been put aside for more minute examination, it has disappeared. The animal seemed uniformly black at a little distance, on a closer view it was found to be covered with black longitudinal lines, extending the whole length, and though not broad, so closely approximate as scarcely to show the ground colour at all, at the extremity quite coalescent. Foot white. There is, I see, a var. *ater*, Raz., but I have not seen it described.

SUB-GENUS LEHMANNIA, Heyn.

Lehmannia variegata, Drap. (=*Limax flavus*, Aucc.)—Common.

Var. *colubrina*, Pini.—I once took an example of this beautiful variety in the cellar of my house.

Lehmannia marginata, Müll. (= *Limax arborum*, Aucc.)—This species appears to be rather more common in the neighbourhood of Tuxford than formerly; last year, I took an example which had entered the house in company with *L. maximus.* Highfield House, Lowe. Creswell, Pleasby, Mansfield, Southwell, &c., Musson. Haughton, Tuxford.

GENUS AGRIOLIMAX, Malm.

Agriolimax agrestis, L.—A great pest in this as in other counties.

Var. *punctata*, Pic.

Var. *sylvatica*, Moq.

Var. *tristis*, Moq.

Var *nigra*, Morel., and

Var. *albida*, Pic., all are common.

Agriolimax laevis, Müll.—Highfield House, Beeston, Lowe. Bawtry, Rufford, &c., Musson.

Family TESTACELLIDÆ.

GENUS TESTACELLA, Cuvier.

Testacella scutulum, Sby.—Welbeck Gardens.

ON A SUCCESSFUL METHOD OF REARING D. GALII.

BY R. NEWSTEAD, F.E.S.,
Curator of Chester Museum.

(*Read before the Lancashire and Cheshire Entomological Society.*)

Let me first tell you how I got my larvæ of *D. galii*, before I say a word as to my method of rearing the imagines.

My first experience with *Deilephila galii* was in that memorable month of September, 1888, when Mr. Brockton Tomlin, of Chester, brought for my inspection some seven larvæ of this magnificent British insect. Mr. Tomlin's first question was: Do you know these larvæ? After a long guess I hit on the right name, but accused him of buying them from a dealer. You can imagine my surprise when he told me that he had taken them at Wallasey, and that there were plenty left. In spite of ill health, a friend and I set out for Wallasey the following Saturday, September 8th, and by noon I had managed to secure four full-fed specimens. After lunch we were joined by Mr. F. Archer and two nephews. A few hints from them enabled me to obtain seven more, making in all a total of eleven larvæ. On the

Monday following while getting some of the food plant (*Galium verum*) at Crosby, I boxed two more larvæ, and later in the day I paid a second visit to Wallasey, where I was successful in the space of two hours in taking eight more specimens.

My collecting apparatus was an ordinary "band box" with a good sized hole cut in the lid, which was kept plugged with a handful of grass. Such an arrangement as this was an effectual preventative against "sweating" of which I had heard sad stories, through the over-crowding of larvæ in small tin boxes. I, at any rate, meant to be on the safe side in this respect. The plug of grass was easily removed when an additional larva was found, and I rested quite content that it was an effectual plug, until nearing Chester, when I was suddenly awakened to the fact, that one of the larvæ had escaped, and was quickly making its way between two ladies, who occupied seats opposite to me in the compartment. Horrors! you should have seen their faces! "Sam Edwards" was never in a worse plight. Fortunately for me I had no sooner returned the escaped larva when the train pulled up at Chester Station, which I need hardly say was a great relief of mind; and I do not know that I ever left a railway carriage, in a greater hurry in my life.

Having obtained my larvæ I was much exercised as to the method of rearing them, especially so as I had had no previous experience with them. However, I proceeded as follows:—A strong box provided with a lid of strong gauze was three parts filled with dry sand. In this the 21 larvæ were placed and supplied twice daily with fresh, "hard" food. The box was so placed as to catch all the rays of the sun, but was always put under shelter at night, and also in wet weather. They seemed to revel in the hot sunshine but became more or less torpid in wet cold weather and at the approach of night.

My first larva pupated about a week after its capture and the last disappeared about the 22nd of September.

Three or four pupated in the sand about an inch below the surface, the remainder spun slight cocoons on the surface, mixing with them portions of the food-plant, &c., and therein pupated.

At the end of October the pupæ were kept indoors entirely and placed in a temperature of 45 to 50 deg. Far. The room in which they were kept was cool, and rather dark, faced due north, and was slightly damp. In this they remained to the end of December. On the following Januasy 1st, they were removed to a temperature of 50 to 55 deg. Far., and were slightly sprinkled with water for the first time. On the 23rd of the same month four pupæ were placed in a "Pine Stove" in a temperature of 60 to 75 deg. They were placed on sand in a large flower pot, and well covered with moss which was kept constantly damped. On the 26th of February a magnificent ♂

hatched, and the three remaining pupæ all produced perfect examples, the last appearing on the 2nd of March.

As my method proved so successful I placed the remainder of my pupæ in the "Pine Stove" and treated them in the same way as the first lot, the only difference being a slight increase in the day temperature, which sometimes was as high as 90 deg. during sudden bursts of sunshine.

From this lot of pupæ the first imago hatched in 24 days. The last imago appearing on the 31st March.

In all 17 pupæ were treated under the foregoing method, all of which produced imagines but one, and this pupa, strange to say, lived on for a long time, and until some weeks after when it was placed in "spirits" to be preserved, and to complete a life-history of its species for our Museum. I should also add that four larvæ out of the total number were also preserved, which account for my having but the 17 pupæ mentioned above. I trust you will not be like a correspondent in the "Entomologist," who writing on the forcing of *D. galii*, says:—"To the fortunate possessor of a hot-house this is easy enough." I did not find it very easy for to say nothing of the constant attention tbey needed in the way of damping and shading; for the sun was always kept from them. I had an almost daily walk of a mile to their place of keeping, for a period of some 66 days. I was not the fortunate possessor of a hot-house and must here acknowledge my indebtedness to Mr. A. O. Walker for the use of his "Pine Stove," without which I fear many of my insects would have died in the pupal stage.

The following is an abstract of the times and temperature in which the larvæ and pupæ were kept.

LARVÆ.

September 18th to October 21st. Outside all day fully exposed to sun, but always taken in during rain and at night.

PUPÆ.

November and December. Indoors. Temperature, day 50° night 45°
January 1st to 22nd ,, ,, ,, 55° ,, 46°
Once damped.
January 23rd to time of hatching ,, ,, 75° ,, 60°
Kept constantly damp.

The above are the average maximum and minimum temperatures. On cold nights the temperature would be considerably lower, and on bright sunny days in March the temperature would sometimes rise as high as 90 deg.

Some of our members may have been equally fortunate as myself in rearing *D. galii*, on a much simpler plan. I have heard of several methods, but do not think anyone could adopt a more successful one than my own. My "Hot-house" may be a bone of contention but, nevertheless, if it should ever be my lot to see another *Galii* year and should not have the kindly loan of a hot-house, I should adopt a similer plan, on a smaller scale, and certainly maintain the temperatures given above, as far as possible, which with very little mechanical ability could be easily achieved.

I saw 90 odd larvæ of *D. galii* in the possession of our late lamented member Mr. F. Archer, and I believe he added many more. Mr. Archer told me he should place his pupæ in the kitchen on the top of the clock. I saw him the following year when he told me that only some half-dozen imagines had hatched and he feared that the rest of his pupæ had rotted.

I felt grieved that so many imagines had perished of what I consider the most beautiful of all the British Sphingidæ.

P.S.—I think it advisable to add, that although *D. galii* was so abundant in 1887 at its old Cheshire habitat, in 1888, I failed to find a single specimen of the larva on the Prestatyn Sandhills—although I spent many hours searching for them—at the same time when they were abundant at Wallasey. I think this is of importance as Prestatyn, I am told, is also one of its old habitats.

Reports of Societies.

CITY OF LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY.

October 4th, 1893.—Henry John Elwes, Esq., F.L.S., F.Z.S., President, in the chair. Mr. Arthur Ernest Gibbs, F.L.S., of The Hollies, St. Albans, was elected a Fellow of the Society. Mr. F. Merrifield exhibited specimens showing the effects of temperature in the pupal stage on several species of Lepidoptera. *Vanessa polychloros* was much darkened, especially towards the hinder margin, by a low temperature. *Vanessa c-album* showed effects on both sides, especially in the female; they were striking on the under side. Several examples of the striking effect produced by temperature on the summer emergence (*prorsa*) of *Araschnia levana* were exhibited. Some *Vanessa io* showed the gradual disintegration, by exposure to a low temperature, of the ocellus on the fore wing, which in the extreme specimens ceased to be an ocellus, and was a remarkable confirmation of Dr. Dixey's views of the origin of that ocellus, as exemplified in the plate attached to his paper in the Entomological Society's Tnansactions for 1890. Mr. Goss stated that in his experience of *V. c-album* in Northamptonshire, Gloucestershire, Herefordshire, and Monmouthshire, the form with the pale underside was the first brood, occurring in June and July; and that the second brood, occurring from the end of July to October, was invariably dark on the underside. Mr. Jacoby, Mr. Merrifield, and the President continued the discussion. Mr. A. H. Jones exhibited Lepidoptera collected in Corsica in June last, including dark forms of *Polyommatus phlœas* (Vizzavona); *Lycæna astrarche*, in which the orange marginal band is very brilliant on upper and under sides of both wings (Vizzavona); *Lycæna argus*, the females of which are much suffused with blue, probably var. *calliopis*; a series of *Vanessa urticæ* var. *ichnusa*, bred from larvæ found at Vizzavona (4000 feet); *Argynnis elisa*, *Satyrus semele* var. *aristæus*, *Satyrus neomiris*, *Cœnonympha corinna*, both spring and summer brood (Vizzavona); *Syrichthus sao* var.

therapne, and many others. Mr. G. C. Champion exhibited for Mr. G. A. J. Rothney, a number of *Methoca ichneumonoides*, Latr. (female), taken at Boxhill, Sussex, showing great variation from the usual large black and red form to a small and nearly black one. Dr. D. Sharp exhibited a pupa of *Galleria melonella*, on which the eggs of a parasitic Hymenopteron, as he believed, had been deposited while the insect was in the cocoon. He also exhibited, from the collection of Alexander Fry, Esq., the hitherto unique *Aprostoma planifrons*, Westw. The genus was correctly assigned by Westwood to the *Colydiidæ*, though described as a Brenthid. Mr. J. J. Walker exhibited the following species of *Halobates*, viz.:—*H. sericeus*, Esch., from the Pacific; *H. sobrinus*, B. White, from Marquesas Islands; *H. wüllerstorffi*, Esch., from Marquesas Islands; *H. princeps*, White, from the China Sea; and a female of *H. wüllerstorffi*, with ova attached. Mr. W. H. B. Fletcher showed a variable series of seventy-five *Cymatophora or*, bred in 1893 from larva from Sutherland, a series of about forty *C. ocularis* bred-in from Oundle. Also a series of thirty-three moths, all females, supposed to be hybrids between *C. ocularis* male and *C. or* female, from the above stock in each case, bred as a second brood in August and September, 1893. He stated that he placed the reputed parents in a muslin sleeve on a branch of *Populus nigra*, and did not open the sleeve until the resulting larvæ required fresh food. To the best of his belief the female parent had no chance of pairing with a male of her own species. The supposed hybrids resembled the female parent, except that both orbicular and reniform stigmata were very conspicuous, being pure white filled up slightly with black, whereas in *C. or* they are usually inconspicuous and the orbicular are sometimes wanting. Noue of the *C. or* bred had the stigmata developed so fully as had the hybrids, which were most uniform in this respect. Mr. F. J. Hanbury exhibited a specimen of *Leucania vitellina*, taken at Brockenhurst on August 24th, 1893, by Mrs. Hanbury and another taken by himself at Freshwater, Isle of Wight, on September 7th; also an extraordinary *Gonepteryx rhamni*, showing red blotches at the tips of the fore-wings, taken by a gardener at Walthamstow, Essex. Mr. C. G. Barrett exhibited a gynandrous *Argynnis paphia* recently taken in the New Forest by Mr. Cardew. Mr. J. M. Adye exhibited a specimen of *Deilephila livornica* recently caught at Christchurch, Hants. Mr. Elwes exhibited and described two species of the genus *Œneis Chionobas*, Bdv.), *Œ. beani* and *Œ. alberta*, from North America, which had not been previously described, and stated that he had prepared, with Mr. Edwards's assistance, a revisiou of this very difficult genus, which would be read at the November meeting. Mr. Osbert Salvin communicated a paper entitled "Description of a new genus and species (*Baronia brevicornis*) of *Papilionidæ* from Mexico," and exhibited both sexes. Dr. Sharp read a paper entitled "On the Cost and Value of Insect Collections." Mr. W. F. H. Blandford, Mr. McLachlan, Mr. Jacoby, Mr. Waterhouse, and the President took part in the discussion which ensued. Professor Auguste Forel communicated a paper entitled "Formicides de l'Antille, St. Vincent, récoltées par. Mons. H. H. Smith." Mr. W. F. H. Blandford read a paper entitled "Description of a New Sub-family of the *Scolytidæ*." The President, Mr. Jacoby, and Mr. Waterhouse took part in the discussion which ensued.

October 18th.—Henry John Elwes, Esq., F.L.S., F.Z.S., President, in the chair. Professor C. H. Tyler Townsend, of the Institute of Jamaica, Kingston, Jamaica, was elected a Fellow of the Society. Mr. R. Adkin exhibited two *Leucania vitellina* and one *L. extranea*, taken by Mr. B. W. Adkin in the Scilly Islands, in August, 1893. Mr. R. South exhibited a specimen of *Polyommatus bœticus*, and a number of varieties of *Chrysophanus phlœas*, captured in Kent, in September last, by Mr. Sabine; also a curious variety of *Argynnis euphrosyne*, taken in Lancashire in May, 1893, by Mr. T. Baynes; a pallid variety of *Vanessa urticæ*, taken by Mr. E. Cox in Monmouthshire, in July, 1893; and a *Triphæna pronuba*, the right wings of which were typical, and the left wings resembled the variety *innuba*, caught at sugar, in Dovedale, Derbyshire, by Mr. Blagg, in July, 1893. Mr. G. H. Verrall exhibited a specimen of the Tsetse *(Glossina morsitans)*, and also one of the common European allied species *(Stomoxys calcitrans)*. He also exhibited a specimen of *Hæmatobia serrata*, Dvs., which he stated was not uncommon on cattle in England, but believed to be harmless; while in North America the dreaded "horn-fly" is said to be the same species. Mr. Elwes exhibited a larva which he had found three days previously under stones on a moraine, apparently quite destitute of vegitation, in the Tyrol, at an elevation of about 7000 feet. He remarked on the number of Alpine butterflies, some of them in fresh condition, which he had seen whilst chamois-hunting in the Tyrol during the last week, and he suggested that in such a fine autumn as the present one collectors might find more novelties among the larvæ of Alpine species than in the summer. Colonel Swinhoe read a paper entitled "A list of the Lepidoptera of the Khasia Hills" (Pt. 2). Mr. Elwes said he thought all entomologists would be grateful to Colonel Swinhoe, Mr. Hampson, Mr. Meyrick, and others, for the work they had recently been doing in describing the moths of India; but as the district of the Khasia Hills was probably richer in species than in any other part of India, except Sikkim, and new species were being received almost daily, it was impossible to make any list complete. Mr. Jacoby, Mr. McLachlan, Mr. Jenner Weir, and Colonel Swinhoe continued the discussion. Mr. E. Meyrick communicated a paper entitled "On a Collection of Lepidoptera from Upper Burma." The author stated that the species enumerated in the paper were collected by Surgeon-Captain Manders whilst on active service in the Shan States and their neighbourhood, shortly after the British annexation of the territory. A discussion followed, in which the President, Surgeon-Captain Manders, and Colonel Swinhoe took part.—H. Goss, *Hon. Secretary.*

General Notes.

A DAY ON THE DEAL SANDHILLS.—On September 28th, I had a few hours collecting at the above locality. It was not a very favourable day for collecting, there being a strong S.W. wind, rendering collecting on the sandhill anything but pleasant; however, I managed to turn up a few good things which may be worth recording. All those I took were taken from moss or by shaking the long grass on the slopes of the sandhills. Among the *Geodephaga* I took *Harpalus servus* 2, *H. serripes* 1, *H. tardus*, *H. consentaneus*, *H. anxius*, a few of each; five species of *Calathus* turned up, the best being *Calathus fuscus* and *C. flavipes* and the commonest *C. mollis;* I obtained about 50 of the local *Dromius monostigma* by shaking the grass, and 5 *Philonthus lepidus* in moss. I was particularly glad to obtain the latter insect, as besides being very local it was an addition to my collection. *Heliopathes gibbus* was abundant in moss and *Olibrus consimilis*, common, by shaking grass. Among the other species which turned up were—*Oxytelus maritimus*, *Silpha lævigata*, *Simplocaria semistriata*, *Helops pallidus*, *Ægialia arenaria*, *Lema melanopa*, *Baptophila rubi*, *Agalastica halensis*, &c.; I also shook *Xanthia ferruginea* out of the grass, and several larvæ of *Bombyx rubi* occurred. The only representative of the *Diurni* to be seen was

Polyommatus phlæas, and only one or two of this, although the sun was shining brightly most of the time.—A. FORD, Glen Mount, Braybrooke Road, Hastings, October 9th, 1893.

AGARACOPHAGUS CEPHALOTES IN THE HASTINGS DISTRICT.—I found a fine specimen of this rare insect among some undetermined Anisotomidæ; it was taken at Bopeep, near Hastings, in flood refuse, October 21st, 1891.—A. FORD.

In my note on "Coleoptera in the London District," in the October number of the "British Naturalist," I omitted to mention *Coccinella mutabilis*, which I swept commonly at Oxshott.—A. FORD.

LEPIDOPTERA ATTRACTED BY HONEY-DEW.—On the 24th of August, 1887, while returning from the Ince Marshes after a few hours work with the lantern, my attention was attracted by a number of moths flying round a large willow-bush. On examining the bush more carefully, the leaves were found to be covered with "honey-dew," which had been produced by a species of Aphis. So attractive was the "honey-dew" that my father and I, in the space of about an hour, had taken as many specimens as I felt inclined to set out. The species for the most part were very common, but, living in the hopes of obtaining better things, I visited the same bush for three nights in succession. Each night the bush was equally productive, but the end of it all was, that a thunder-storm came on and washed the honey-dew away, and so put an end to my sport.

I have heard of honey-dew being attractive to Lepidoptera, but *my* experience is, that such instances are very rare. Hence I venture for the first time to place this on record.

The following is a list of the species taken:—*Cidaria populata*, *C. russata*, very numerous, *Epione apiciaria*, many, *Leucania lithargyria*, a few, *Calamia phragmitidis*, one, *Xanthia cerago*, abundant and very variable, *Noctua rubi*, five, *N. xanthographa*, twelve.

In my diary I find a note that five other species were taken, but common and not worthy of note; thus making a total of thirteen species.—R. NEWSTEAD, Chester, May 6th, 1893.

MACROGLOSSA STELLATARUM—Several specimens of *M. stellatarum* have been seen here this autumn; two that have been taken are in my possession. One of these, a very fine specimen, was captured on October 2nd in my father's draper's shop. The shop is on the shady side of the road, and, as the insect was taken about noon, when the sun was shining brightly, I cannot account for its presence in so peculiar a place.—F. G. HEWETT, Sittingbourne.

M. STELLATARUM emerges from the pupa at the end of September or the beginning of October, flies about for a day or two only, and then retires for hybernation. By the accounts that have reached me, there is no doubt the insect has been unusually abundant.—J.E.R.

BRITISH MUSEUM NATURAL HISTORY

EXCHANGE.

Duplicates--Fine Blandina, Cassiope, Edusa, Aglaia, Adippe, Sibylla, Coryli*, Cursoria, Carmelita*, Cordigera, Conflua (Shetland), Porphyrea, Dipsaeeus, Pincta*, Curzoni, Immanata, Trepidaria, Carbonaria, Pinetaria, Ruficinctata, Cæsiata, Lobulata, Fumata, Didymata (Shetland), Testata, Populata (vars.), Blomesr, Cambricaria, Argentula, Osseana, Duplana, Alpinalis, Furcatellus.—J. Maddison, South Binley, Durham.

British Birds Eggs, Side blown with Data. Duplicates—Spotted Flycatcher, Song Thrush, Blackbird, Hedge Sparrow, House Sparrow, Tree Sparrow, Robin, Winchat, Sedge Warbler, White-throat, Pied Wagtail, Skylark, Yellow Bunting, Chaffinch, Greenfinch, Starling, Jackdaw, Swallow, Land Martin, Stock Dove, Partridge, Red-legged Partridge, Lapwing, Land Rail, Moorhen, Guillemot, Lesser Tern. Desiderata—Many other birds' eggs.—C. Couldwell, 1, Park Avenue, Cane Street, Hull.

Coleoptera—Duplicates—Helops pallidus, O. atroapterus, Apion carduorum, ononis, Ceuth. litura, Apion virens, &c.—B. Tomlin, The Green, Llandaff.

Duplicatees—Filigramaria, Zonaria, Chi, Ulmata, Didymata, Glauca, Festucæ. Desiderata—Numerous local series.—J. W. Baldwin, 472, Darwen Rd., Dunscar, Nr. Bolton.

Duplicates—Corynetes rufipes, C. ruficollis, Nitidula bipustulata, Habrocerus capillaricornis, Ocypus ater, Rhyncolus cylindrirostris, Aphodius fætens, A. nitidulus, Bembidium ephippium, Dermestes undulatus, Anthicus instabilis, Thyamis distinguenda, Lithochara brunnea, Amara convexiuscula, Hopatrum sabulosum, and nearly 500 others. Desiderata—numerous.—A. Ford, Glen Mont, Braybrooke Road, Hastings.

Duplicates—Edusa (few ♂), tages, alveolus, sylvanus, trifolii (vars.), puta (light and dark), suffusa, nictitans (vars.), furuncula, chenopodii, meticulosa, xanthographa (vars.), c-nigrum, glyphica, mi (few) and odd specimens of many more. Desiderata—numerous, especially local Northern species.—A. Ford, Glen Mount, Braybrooke Road, Hastings.

Duplicates—Edusa, corydon, adonis, tipuliformis, hirtaria, citraria, rupicapraria ( ), defoliaria (♀), vulgata (bred, dark London forms) assimilata, bipunctaria, pallens, lithargyria, testacea, furuncula, literosa, blanda, puta, suffusa, nigricans, N. rubi, c-nigrum, perla, capsincola (a few, bred), libatrix. Pupæ of alchemillata. Desiderata—very numerous; especially, obfuscata, simulata, trepidaria, tristata, albicillata, fumata, salicata.—Louis B. Prout, 12, Greenwood Road, Dalston, N.E.

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CITY OF LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY meets on the First and Third *Tuesdays* in each month, at the London Institution, Finsbury Circus, E.C., from 7.30 to 9.30 p.m. Fixtures:—November 7, Pocket Box Exhibition. Nov. 21, "The History of Butterfly Classification," by Dr. F. J. Buckell. Dec. 5, Annual Business Meeting, President's Address, &c.

ENTOMOLOGICAL SOCIETY OF LONDON, 11, Chandos Street, Cavendish Square, W. Wednesday, Nov. 1st, 1893, at 7 o'clock in the evening.

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TO CORRESPONDENTS.

A considerable number of communications and Reports of Societies are unavoidably held over for want of space.

Subscriptions, exchanges, business correspondence, notes, papers for publication, and all other communications, to be addressed—JOHN E. ROBSON, HARTLEPOOL.

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EDITED BY

WALTER E. COLLINGE,

Mason College, Birmingham.

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THE MOLLUSCA OF NOTTINGHAMSHIRE.

BY W. A. GAIN.

(Continued from page 226.)

Family VITRINIDÆ.

GENUS VITRINA, Drap.

Vitrina pellucida, Müll.—Common in suitable localities.

Family ZONITIDÆ.

GENUS HYALINIA, Agass.

SECTION VITREA, Fitzinger.

Vitrea crystallina, Müll.—Common and widely distributed.

SECTION POLITA, Held.

Polita alliaria, Miller.—Generally common under stones and among fallen leaves.

Polita glabra, Stud.—Pleasley Vale, very plentiful under stones; Creswell Craggs; Markland Gripps; Worksop. Musson.

Polita nitidula, Drap.—Plentiful and generally distributed.

Var. *helmii*, Ald.—Kingshaugh, near Tuxford.

Var. *nitens*, Mich.—Arnold, Dodd.

Polita pura, Ald.—Common and generally distributed.

Var. *margaritacea*, Jeff.—More common than the type.

Polita hammonis, Ström. (=*radiatula*, Ald.)—Bevercotes; Rufford; Ossington; Wollaton; Pleasley Vale; Stanton-on-the-Wolds; Tollerton, &c. Musson.

Polita excavata, Benn.—Lowe records one specimen from the neighbourhood of Sawley.

Polita cellaria, Müll.—Common and generally distributed.

Var. *albinos*, Moq.—Tuxford; Creswell.

SECTION ZONITOIDES, Lehm.

Zonitoides nitida, Müll.—Widely distributed, banks of rivers and streams, and damp places generally.

SECTION CONULUS, Fitzinger.

Conulus fulvus, Müll.—Widely distributed in woods, &c.

Family HELICIDA.

GENUS PATULA, Held.

SECTION PYRAMIDULA, Fitz.

H. (Pyramidula) rupestris, Drap.—Rare. Lowe. Not uncommon, Dodd, article "Mollusca" in "Geology and Natural History of Nottinghamshire." I have not seen an example found in this county.

SECTION PATULASTRA, Pfr.

H. (Patulastra) pygmaea, Drap.—Common in many places among dead leaves and twigs. Wollaton; Widmerpool; Kirkby-in-Ashfield. Musson. Decoy at Haughton; woods at Ossington.

SECTION DISCUS, Fitz.

H. (Discus) rotundata, Müll.—Common and generally distributed.

Var. *alba*, Moq.—Pleasley Vale. Musson. Creswell; Sherwood Rise. Dodd.

GENUS HELIX, L.

SECTION ACANTHINULA, Beck.

H. (Acanthinula) aculeata, Müll.—Plentiful in many parts. Colwick; Lenton; Stanford. Musson. Bevercotes; Ossington.

SECTION VELLONIA, Risso.

H. (Vellonia) pulchella, Müll.—Common and generally distributed.

Var. *costata*, Müll.—Radford; Chilwell; Wollaton. Musson.

SECTION HYGROMIA, Risso.

SUB-SECTION CARTHUSIANA, Kobelt.

H. (Carthusiana) cantiana, Mont.—Found near Coatham by Mr. Musson. Stanton-on-the-Wolds. Dodd.

SUB-SECTION ZENOBIA, Gray.

H. (Zenobia) revelata, Fer.—Highfield House. Lowe. This species has not recently been found in the county.

SUB-SECTION TRICHIA, Hartm.

H. (Trichia) granulata, Alder.=*H. sericea*, Jeff.—Very local. Kingshaugh and a ditch at Scarthing Moor. In the former locality it is confined to a short portion of a hedge-bottom, when first discovered it was abundant, after the hedge had been cut it was much scarcer for some years, now it is more common. In the other locality, distant rather more than three miles in a straight line, it is found very sparingly.

H. (Trichia) rufescens, Penn.—Dodd gives Highfield House Estate on the authority of Lowe.

H. (Trichia) hispida, L.*=*H. concinna*, Jeff.—Widely distributed, but not abundant. Nottingham Castle; Colwick; Wollaton; Pleasley; Creswell; Worksop; Newark; Moorhouse; Tuxford. Musson.

Var. *hispidosa*, Mouss.*=*H. hispida*, Jeff., &c.—Abundant and generally distributed.

---

* As the type specimen of *H. hispida* in the Linnæan collection is the form *concinna*, Jeff., this is now considered the type form. Whether this fact is sufficient to warrant the alteration is perhaps open to doubt.

Var. *albida*, Jeff.—Radford ; Southwell ; Colwick ; Stanton ; Creswell. Musson. Around the Roman Camp, at Laxton, this variety is abundant, white and extremely light coloured examples forming by far the greater part of those found.

Var. *subrufa*, Moq.—Carlton ; Ossington ; and many other places with var. *hispidosa*.

Var. *fusca*.—Not uncommon. Dodd.

Var. *depilata*, Alder.—Bawtry, &c.

Var. *subglobosa*, Jeff.—Not uncommon. Dodd.

Var. *conica*, Jeff.—Decoy at Haughton.

Var. —— With a central pale band. Not uncommon.

SECTION XEROPHILA, Held.

SUB-SECTION HELIOMANES, Fer.

H. (*Heliomanes*) *variabilis*, Drap.=*H. virgata*, Da Costa.—Staunton; Alverton, abundant ; Coatham, railway embankments. Musson.

SUB-SECTION HELICELLA, Hart.

H. (*Helicella*) *itala*, L.=*H. ericitorum*, Mull.—Coatham. Musson.

Var. *minor*, Moq.

Var. *leuceozona*, Moq.

Var. *alba*, Charp.

These three varieties occur at Coatham, with the type.

SUB-SECTION HELIOCOPSIS, Fitz.

H. (*Heliocopsis*) *caperata*, Mont.—Local, and generally scarce. Gedling ; Stanton-on-the-Wolds ; Ruddington ; Coatham ; Tollerton; Creswell ; Gamstom, one example on railway bank. Musson. Railway bank at Carlton-on-Trent.

Var. *ornata*, Pic.—Gedling. Dodd.

SECTION CAMPYLAEA, Beck.

SUB-SECTION CHILOTREMA, Leach.

H. (*Chilotrema*) *lapicida*, L.—Local. Plentiful on a wall at Mansfield Woodhouse ; Pleasley ; Southwell, one dead shell and fragments of another ; Kirkby-in-Ashfield, one dead shell. Musson. I have gathered this species freely at Creswell, and have found dead examples from time to time in the road between Tuxford and Egmanton. The presence of dead shells in so many localities where it is not now found living seems to indicate the dying out of the species in this county, except in a few especially favorable localities.

SECTION ARIANTA, Leach.

H. (*Arianta*) *arbustorum*, L.—Local, but plentiful where it occurs. Colwick and the neighbourhood; Southwell; Pleasley. Musson. Tuxford; Scarthing Moor; Moorhouse; Laxton.

Var. *fuscescens*, D. and M.=Var. *marmorata*, Taylor.—Moorhouse; Dunham.

Var. *flavescens*, Moq.—Colwick; Southwell. Musson. Moorhouse; Scarthing Moor.

Var. *pallida*, Taylor.—Moorhouse.

Var. *fusca*, Fer.—With type. Dodd.

Var. *albina*, Moq.—Colwick. Dodd.

Var. *conoidea*, West.—Near Darlton, one example.

Var. *alpestris*, Ziegl.—Moorhouse.

SECTION TACHEA, Leach.

H. (*Tachea*) *nemoralis*, L.—Widely distributed, and plentiful where it occurs. The various band-formulæ need not be enumerated, of colour vars. we have *libellula* and *aurantia*, *rubella* and *carnea*, *castanea* and *olivacea*.

Var. *minor*, Moq.—Near Babbington Springs, plentiful; Kingshaugh.

Var. *albolabiata*, Von Mart.—Tuxford, rare.

Var. *roseolabiata*, Tayl.=*hybrida*, Poir.—Neighbourhood of Tuxford.

Var. *hyalozonata*, Taylor.—One example occurred some years ago at Kingshaugh, repeated searchings every succeeding year have failed to discover a second.

Var. *bimarginata*, Picard.—Not unfrequent near Tuxford.

Var. *sexfasciata*, Moq.—I found a shell of this variety at Darlton. *Libelulla* 123345.

H. (*Tachea*) *hortensis*, Müll.—Plentiful in many localities. Those with which I am acquainted belong either to the bandless form, or to the five banded, many of the latter having the bands more or less fused, the var. *coalita*, Moq.

Var. *lutea*, Moq.—The commonest colour.

Var. *subalbida*, Loc.—Commonly found with var. *lutea*.

Var. *lilacina*, Taylor.—Moorhouse, remarkably bright and glassy examples occasionally occur.

Var. *roseolabiata*, Taylor.=var. *hybrida*, Jeff.—Moorhouse.

Var. *minor*, Moq.—Scarthing Moor; Prior's Park, near Tuxford.

Var. *tenuis*, Baudon.—Prior's Park. These examples occur in a ditch only a few yards in length, some have such fragile shells that it is impossible to extract the animals without breaking them, all the examples found belong to the colour var. *lutea;* in the same ditch individuals are found having their shells of quite the ordinary thickness.

Var. —— (of animal).—Portion visible when the animal is in the shell of the ordinary color. On extracting, all except the more slender hinder portion bright yellow. Two of these were obtained at Moorhouse in 1883, the shells were of the peculiar glassy texture described under var. *lilacina.* When found the lips were not completed, and the animals were kept in confinement till they were fully formed; their food was coltsfoot exclusively. No special result has been observed in other examples fed in the same manner. The variety might be called *aurea.*

SECTION POMATIA, Beck.

SUB-SECTION CRYPTOMPHALUS, Moq.

H. (*Cryptomphalus*) *aspersa*, Müll.—Common. Generally distributed.

Var. *albofasciata*, Jeff.—Tuxford; Creswell.

Var. *undulata*, Moq.—Worksop; Tuxford, &c.

Var. *flammea*, Picard.—Worksop.

Family BULIMIDA.

GENUS BULIMINA, Ehr.

SECTION ENA, Gray.

Bulimus (*Ena*) *obscurus*, Müll.—Widely distributed, though I have never found it plentiful.

Family CIONELLIDA.

GENUS CIONELLA, Jeff.

SECTION ZUA, Leach.

Zua lubrica, Müll. = *Cochlicopa lubrica.*—Common throughout the county.

Var. *hyalina*, Jeff.—Haughton Decoy.

SECTION CECILIOIDES, Fer.

Cecilioides acicula, Müll.=*Achatina acicula.*—Local, but abundant in some places. Highfield House. Lowe. Attenboro'; Tollerton; Colwick; Pleasley; Hazleford, rejectamenta. Musson. Plentiful at Scarthing Moor, and in rejectamenta of the Trent. I have not taken it living.

GENUS AGRAULINA, Bourg.

SECTION AZECA, Leach.

Azeca tridens, Poult.=*Cochlicopa tridens*.—Local and rare. Highfield House. Lowe. Pleasley Vale, more common on the Derbyshire side. Musson.

Family PUPIDA.

GENUS PUPA, Lam.

SECTION TORQUILLA, Stud.

SUB-SECTION ABIDA, P.

Pupa (*Abida*) *secale*, Drap.—Nottingham Castle rock. Lowe. I know of no recent record for the county.

SECTION CHARADROBIA, Alb.

Pupa (*Charadrobia*) *anglica*, Fer.=*Pupa ringens*, Jeff.—Rare. Highfield House. Lowe. Grives Wood, near Kirkby-in-Ashfield. Musson. Mr. Musson, in a recent letter, says: "I found *Pupa ringens* near Kirkby, in a spinney in an old magnesian-limestone quarry. The locality so much resembled one in Herefordshire that I made a special excursion to look for it . . . and we found it."

SECTION LAURIA, Gray.

Pupa (*Lauria*) *cylindracea*, Da Costa.=*Pupa umbilicata*, Drap.—Plentiful, but rather local. Not rare at Creswell and Markland Gripps. Musson. Haughton Chapel and Decoy.

Var. *edentula*, Moq.—Highfield House. Lowe.

SECTION PUPILLA, Leach.

Pupa (*Pupilla*) *muscorum*, L.=*Pupa marginata*, Drap.—Local. Highfield House. Lowe. Bingham Moor, turned up by moles. Musson. Scarthing Moor; rejectamenta of the Trent, and of a stream at Weston. I have not found it living.

Var. *unidentata*, Pfr.—Highfield House. Lowe.

SECTION ISTHMIA, Gray.

Isthmia edentula, Drap.=*Vertigo edentula*.—Local. Thrompton; Wollaton; Lenton; Stanton-on-the-Wolds; Grives Wood, near Kirkby in-Ashfield. Musson. Borders of the lake at Clumber; common at the Decoy, Haughton; rejectamenta at Carlton-on-Trent.

SECTION VERTIGO, Müll.

SUB-SECTION ALAEA, Jeff.

Vertigo (*Alaea*) *antivertigo*, Drap.—Near the lake at Highfield House. Lowe. Bingham Moor, turned up by moles; Kirkby;

Pleasley Vale. Musson. East Drayton; in rejectamenta at Carlton-on-Trent, and at Scarthing Moor, and below the village of Weston.

Vertigo (*Alaea*) *pygmaea*, Drap.—Highfield House. Lowe. Wollaton; Pleasley; Bingham Moor, turned up by moles; Grives Wood; Widmerpool. Musson. Rejectamenta at Carlton-on-Trent, of streams at Darlton, at Scarthing Moor, and below the village of Weston.

Var. *quadridentata*, Stud.—Rockley; Dunham.

Vertigo (*Alaea*) *moulinsiana*, Drap.—One example at Darlton, dead; rejectamenta at Carlton-on-Trent.

Vertigo (*Alaea*) *substriata*, Jeff.—Highfield House. Lowe. Haggon Fields, Worksop; Bingham Moor. Musson. In the rejectamenta of a steam at Weston, more especially at Scarthing Moor.

SUB-SECTION VERTILLA, Moq.

Vertigo (*Vertilla*) *pusilla*, Müll.—Rare. Highfield House. Lowe. Rejectamenta at Bingham Moor. Musson.

Vertigo (*Vertilla*) *angustior*, Jeff.—Rare. Bingham Moor; Creswell. Musson. Rejectamenta at Carlton-on-Trent, and at Scarthing Moor.

GENUS BALEA, Prid.

SECTION BALEASTRA, Gray.

Balea (*Baleastra*) *perversa*, L.—Very local. Highfield House. Lowe. Annesley; Staunton. Musson. Colwick. Dodd. Plentiful on willows at Darlton.

GENUS CLAUSILIA, Drap.

SECTION MARPESSA, Gray.

Clausilia (*Marpessa*) *laminata*, Mont.—Local and rare. Pleasley. Musson. As this species has been found at Creswell, just beyond the stream which bounds the county at that place, it is probable it will turn up in the neighbouring part of Nottinghamshire.

SECTION PIROSTOMA, Vest.

SUB-SECTION KUSMICIA, Brus.

Clausilia (*Kusmicia*) *perversa*, Pult.=*Clausilia rugosa*, Drap.—Very common, and generally distributed.

Var. *albina*, Moq.—Debdale, near Mansfield. Musson.

Var. *gracilior*, Jeff.—Debdale. Dodd.

Var. *tumidula*, Jeff.—Debdale. Dodd.

Family SUCCINEIDEA.

GENUS SUCCINEA, Drap.

SECTION TAPADA, Studer.

Succinea (*Tapada*) *putris*, L.—Common in suitable situations.

Var. *subglobosa*, Jeff.—Barton. Musson. Ditch at Marnham.

Var. *solidula*, Jeff.—Ditch at Marnham.

Var. *vitrea*, Moq.=*Succinea virescens*, Jeff. (non Morel).—Wollaton; Attenboro'. Musson. Mill-stream at East Drayton.

Succinea (*Tapada*) *elegans*, Risso.—Common.

Var. *pfeifferi*, Rossm.—The greater number of the examples I have found belong to this form.

Var. *virescens*, Morel.—By the Trent at Attenborough. Dodd. [illegible]

Var. *pallida*, Moq.—Dunham.

Var. *ochracea*, Betta.—Very common in a semi-fossil condition at Kingshaugh, and in many other places round Tuxford. I have not found it living.

Family AURICULIDAE.

GENUS CARYCHIUM, Müll.

Carychium minimum, Müll.—Widely distributed and common.

Family CYCLOSTOMIDAE.

GENUS CYCLOSTOMA, Lamark.

Cyclostoma elegans, Müll.—I found this species in a semi-fossil condition at Scarthing Moor. No living example is recorded for the county.

Family ACICULIDAE.

GENUS ACICULA, Hartm.

Acicula lineata, Drap.=*Acme fusca*, Walker.—Rejectamenta at Creswell. Musson.

ADDENDA.

Unio pictorum var. *deshayesii*, Rssm.—Trent at Beeston. Lowe.

Anodon cygnea var. *avonensis*; Mont.—Trent at Beeston. Lowe.

Var. *contorta*, Brown.—Lake at Highfield House. Lowe.

Var. *ventricosa*.—Lake at Highfield House. Lowe.

Arion intermedius var. *plumbeus*, Cllge.—One from the vicinity of Tuxford.

ENTOMOLOGICAL NOMENCLATURE.

(A rejoinder to Mr. Dale's replies; British Natnralist, August pp. 162—164, October pp. 199—201.)

BY F. J. BUCKELL, M.B.

I do not think that I am fairly open to the charge that I commenced my first paper by accusing Mr. Dale of an untruth; certainly nothing was farther from my intention. I never doubted that Mr. Dale believed the statements he was making to be accurate; the whole gist of my complaint against him was that he did not, before publishing them, subject them to that rigid verification which the exigencies of scientific discussion demand.

The justice of this complaint is abundantly demonstrated by Mr. Dale's replies. He explicitly admits his error in regard to *edusa*, Fb., 1776, passes over sub-silentio a great many of my other points, and proves the truth of my contention up to the—shall I say—broom-handle (see p. 162) by his constant reference to magazine articles as the authority for his statements.

Mr. Dale is not yet convinced that he is wrong about the British Association rule. In the official "Report of the Twelfth Meeting of the British Association held at Manchester in June, 1842," at p. 110, I find these words:—"We therefore recommend the adoption of the following proposition: 2. The binomial nomenclature having originated with Linnæus, the law of priority in respect of that nomenclature is not to extend to the writings of antecedent authors." Where is the reference to the 12th edition of "Systema Naturæ"?

Mr. Dale also refuses to admit, that to quote a statement from an author's text, without at the same time pointing out that the author corrected it in his "corrigenda," is to misquote him. Would not Mr. Dale say that I misquoted him if I were to state that in his "History of our British Butterflies" he uses the name *P. alexis*, Scop., for the insect generally known as *P. agestis*, and would he not insist that I ought, before making such a statement, to have referred to his table of corrigenda wherein he rejects that name in favour of *P. medon?* Mr. Dale then asks whether my statement that "Poda was the first to describe the insect" which he called *sinon* is correct, and refers to an earlier description by Ray. Ray, however, was anterior to Linnæus and the latter gives no description of *podalirius* till 1763; his mere reference to Ray in "Syst. Nat. Ed. X." cannot be held to bring that work into adequate conformity with Rule 12 of the British Association.

Into the vexed question of the identity of *hyale*, L., I made no attempt to enter fully; to do so would require more space than the Editor would probably care to devote to it. It is a problem difficult of solution and one upon which my own mind is by no means made up. Mr. Dale seemed to consider the Linnæan references sufficient to settle it, and I pointed out some arguments on the other side which must be taken into account. Mr. Dale still trusts in the Linnæan references, and says he "cannot imagine Linnæus to be such a bad naturalist as to mistake figures of *edusa* for *hyale*." Let us see: *Erebia ligea* is an insect with an easily recognisable facies; for the benefit of those who do not know it, it may be mentioned that its upper surface is very similar to that of *E. medea.* Linnæus describes it correctly enough in "Syst. Nat. Ed. X.," p. 473, No. 97, and more fully in "Fn. Suec. Ed. alt.," p. 275, No. 1050. In the former he gives as a reference "Alb. ins. t. 5. f. 1." Albin's fifth plate contains figures of *Thecla betulæ* and *T. rubi* only, the former, which occupies the upper portion of the plate, bearing the number 7; moreover Albin figures no Satyrid except *E. ianira.* If Linnæus mistook a figure of *T. betulæ* for *E. ligea*, his other references must surely be received with caution. Mr. Dale himself at p. 48 of his book points out an erroneous reference in connection with *C. phlæas.*

The argument from the Linnæan Cabinet I give up. I have now inspected that Cabinet for myself and am quite convinced that no reliance can be placed on its testimony. Some of the insects in it must have been placed there after it reached this country in 1788.

Mr. Dale adds another argument to the following effect: Linnæus includes his *hyale* in "Fn. Suec.", therefore it cannot be identical with our *hyale*, for M. Schizen (? Schöyen) does not include the latter insect among the Rhopalocera of Norway. Now, in the first place, this is much as if one were to say an insect cannot be British because it does not occur in Scotland. That our *hyale* is not found in Norway, Scandinavian authorities are agreed. Through the kindness of Mr. W. F. Kirby, I have been able to refer to a fair number of them. The earlier ones, Thunberg and Dalman, speak only of *hyale* and *palaeno*, and may be reckoned as on Mr. Dale's side. Wallengren, as I am informed by Mr. Kirby, gives both *hyale* and *edusa* as doubtfully reputed to occur in Gothland. Sven Lampa in a list of Scandinavian Lepidoptera published in the "Entomologisk Tidskrift" for 1885 (p. 11), and Aurivillius in his systematic work "Nordens Fjarilar" (p. 6), include both *hyale* and *edusa* and give numerous Swedish localities for both species. Here again then it is evident that Mr. Dale did not carry his enquiries far enough.

Mr. Dale declines to admit his error with regard to the Hubner date, sheltering himself behind a statement of Edward Newman in the "Zoologist," and hinting that Newman may have known more of entomological bibliography than I do. That is very likely, but he certainly did not know more on the subject than Dr. Hagen or Werneburg, who made it their special study. Both in the "Bibliotheca Entomologica" of the former, and in the "Beiträge zur Schmetterlingskunde" of the latter, 1785 is given as the date of the earliest work of Hubner.

Into the new matter introduced by Mr. Dale in his second reply I will not attempt to enter. There is one other point however to which I must allude. Throughout his papers there is abundant evidence that one of the canons of nomenclature which Mr. Dale would lay down is that a name must be suitable in order to be retained. This is to introduce an element of instability with a vengeance; suitability is a matter of opinion, and upon it there will never be agreement. If nomenclature is ever to be settled upon a fixed and stable basis it can only, as I think, be by the adoption of one of the following principles: Either the "law of priority" must be accepted absolutely and the doubtful points arising in its application submitted to the decision of a few experts, or "use and wont" must be the guiding determinant. Upon either basis a settlement might be arrived at without much difficulty; to be generally accepted however it must be the result of agreement between the experts of all countries.

In conclusion let me say that in writing these criticisms I have been actuated by no desire merely to score a victory over Mr. Dale; my object has been to put those who, by the nature of the case, cannot consult the authorities for themselves, in possession of as accurate materials for forming a judgment as possible. Every statement I have made has been based upon a first-hand acquaintance with the work upon which the statement is founded.

"NOTES ON THE FLORA OF GUERNSEY."

BY DR. THEODORE GREEN, M.R.C.S., L.R.C.P., LONDON.

(*Read before the Liverpool Naturalists' Field Club at the Royal Institution, 27th Oct., 1893.*)

The misguided person who first said:—"See Naples and die," meaning that after Naples no other place was worth seeing, very evidently had never been to Guernsey.

Many people go to Naples, beholding it first from the deck of a steamer, and they do die—of cholera, typhoid, and other unpleasant disorders, from inhaling the poisonous fumes arising from the drainage which flows into that bay, the beauty of which poets and guide books rave about. But those who go to Guernsey don't die. They live: and look forward to going again. The island is a perfect paradise for lovers of natural history. Moreover, St. Peter welcomes all to his Port, and never sends anyone away. There are about 16,000 inhabitants of the capital, St. Peter's Port, and their lot is enviable in many ways. It is somewhat refreshing to us, the poor denizens of a sub-arctic climate, to find no further use for overcoats or snowshoes. Here, we find flourishing out of doors the year round, Aloes, Yucca and other Palms, and the Eucalyptus tree. Also the graceful Tamarisk, sometimes thirty feet high, forming in summer a delicious shade for the fisherman's cottage; its delicate green foliage being complemented by its panicled spikes of pink flowers. Along the shore of Rocquaine Bay you may see a tangled hedge of a strange sub-tropical plant, with large orange or crimson composite flowers, and thick triangular leaves, looking something like those of a stonecrop—this is a Mesembryanthemum. I am afraid no words of mine will paint a picture that will do justice to this land of pleasant meadows, shady "water lanes," and rugged headlands jutting far out into the sea, which here, is even more brilliantly green than that surrounding the Isle of Man.

The bays of Guernsey are as frequently visited by the natives as by strangers; for they are adepts in the science and art of picnicking. Under the overhanging rocks are many caves filled with ferns—among which are the Aspleniums, *marinum* and *lanceolatum*, and yard-long fronds of the Hart's-tongue fern. Lower down, great crags of barnacle-covered granite stretch out to sea, their square sides making them look as though they were ruins of some giant Egyptian city. And then the strips of yellow sand between them make fine bathing ground for visitors—the natives of both sexes being fearless swimmers, who love a day in the water when the long rolling waves set towards the shore, leaping over the rocks and spending their energy on the cliffs. I shall never forget one glorious day in Sark. Four of us sailed over there, ostensibly botanising, but in reality we spent the day either bathing or getting ready for the next bathe. The tide was coming in, rapidly as it only can where it rises forty feet. Sark is surrounded by cliffs three hundred feet high and inaccessible in most places. You have to land on a jetty outside the island, and then walk through a tunnel cut through the cliffs, and this brings you into Baker's Valley—a pretty spot. We climbed down where the western gales had detached large masses of cliff. The gullies between them, many fathoms deep, and a few fathoms across, were filled with such inviting emerald water, that soon we were in it, diving and swimming about, borne here and there by the incoming tide, each wave carrying us up or down—perhaps two or three yards—for the water soon gets pent up in these narrow channels. We were indeed "rocked in the cradle of the deep." Ah! I don't believe the man who wrote that song alluded to a stuffy old boat. No: he must have been thinking of the enjoyment of being carried up and down when swimming in the sea, some day after a storm, when the wind has gone, and the waves have lost their broken crests, and rise and fall in unbroken lines, rushing on like the columns of an invading army. But, as this is a Society of Naturalists, I ought to have mentioned that in the gully aforesaid, were many beautiful specimens of *Medusæ*; while the rocks about low water mark were festooned with species of *Fucus*, *Laminaria*, and here and there a crimson patch of the edible *Rhodomena*.

After swim number one, we saw many plants that we had often seen before. The *Rubus fruticosus* was very fine and large—and ripe—the consequence being that one of us declined swim number two, which was the better of the two, referring to a sensation as of 'broken corkscrews' in his interior. We now had to hurry under the broiling sun to the steamer, mine host of the Bel-Air Hotel rubbing his hands at the thought of our missing it, and having to return to him for the night; shedding drops of salty water as we ran down the sultry valley of Bacca or Baker—so-called I suppose, because people weep when they have to leave this gem of all the Norman Archipelago. So back again, to Guernsey's finest bay, Moulin Huet. Here, in places, you may find after cautious climbing, the Golden Samphire, *Inula crithmoides*, and the smaller Sea Lavender, *Statice occidentalis*; while the commoner Samphire makes great patches of soft green against the many coloured rocks. Of course those pioneers of vegetation—the Lichens, mostly grey or orange, have their home here, and seem to enjoy the salt spray which drenches them. In a few places on the coast are larger caves, formed by the erosion of some dyke or fault of a stone softer than the prevailing granite and gneiss. These, are not lit up, nor otherwise disfigured with coloured Christmas-tree lamps, nor are there guides who bawl out—" 'Ere may be seen the organ chamber of Queen Elizabeth. 'We will now pass on to the 'All of Mystery, and observe the curious formation like the 'ind quarters of a helephant: and,—a little more to the right, please ladies and gentlemen,—the stalagmite which exactly resembles a poached egg." No. The Creux Mahie is sometimes lit with magnesium flame, but the visitor is allowed to admire and wonder in silence, while the dull booming of the restless sea outside, makes appropriate music. When accustomed to the light of day once more, we shall see the small blue stars of the autumn squill, *Scilla autumnalis*, dotting the cliffs everywhere in August.

In February, if you have luck, and make diligent search you shall find that tiny Adder's-tongue fern, *Ophioglossum lusitanicum*, with its inch high frond, only found about the cliffs near Petit Bot bay. Here and there in the sunshine, flits like a flame, that rare Tiger moth, *Callimorpha hera* with its wings barred with black instead of being spotted like its British cousin. Near here (Moulin Huet), I saw several noteworthy plants, such as that rare Toadflax, *Linaria repens*, with its fine foliage and wiry stem, and pale blue flowers veined with a deeper lilac; *Hypericum linariifolium*, the narrow-leaved St. John's wort, approaching *H. humifusum* in habit, this species is rare even here. In some of the streams leading down to the bays (Fermain, Petit Bot, Moulin Huet) luxuriates the "Giant Rhubarb," so-called, "*Gunnera scabra.* Its prickly leaves six feet high and four feet across; the stems as thick as one's wrist, armed with hard spines. The flower and fruit grows in a hard cylindrical spike a yard high, and when ripe is covered with bright scarlet nodules like beads. This plant is of course not a native here.

At Rocquaine Bay in a few places in the sand, you may see the tall Sea Stock, *Matthiola sinuata*, with its handsome purple flowers, hoary stem and indented leaves.

Here and there, peeping out of the sand, is that exquisite flower, *Convolvulus soldanella*, the sea convolvulus, with its pink red-veined cups so soon withering. As you get on towards Vazon bay, look out for that rare knapweed, *Centaurea aspera;* and refrain from picking the malodorous wallcress, *Diplotaxis tenuifolia*, which occurs in large clumps, with bright lemon flowers here, and all round the coast. Many plants are common in Guernsey which are rare in Britain, and vice versa. The sea Radish, *Raphanus maritimus*, is very common, and grows to a large size, sometimes having white flowers, but generally yellow. The ordinary *R. raphanistrum* is not at all common, and is of course found inland. The Four-leaved Allseed, *Polycarpon tetraphyllum*, is a common weed in dry places, although so rare with us, being only found in the South-west. Both *Herniaria glabra* and *ciliata* are found on L'Ancresse Common. While there, just get down on your knees and grub for *Isoetes hystrix.* Above ground it looks rather like a stunted specimen of the sand-sedge, so you often have to dig it up, and see whether you have that common plant, or this rarity with its bulb. I had a long hunt without success in a place where I was told it had been found. You will be sure to find the pretty little *Lotus hispidus*, with its very soft hairy leaves, much branched stem, and small orange flowers. The rarer *L. angustifolius*—looking so much like *L. hispidus*—occurs with it in a few places.

The finest flowers I ever saw of the Evening Primrose, *Œnothera biennis*, grew in abundance just off the Common, and as the evening had come, their fragrance was sweet. The *Œnothera odorata* is found in Guernsey, but more frequently so in Jersey.

Owing to the drought, I only obtained very stunted plants of *Silene anglica* var. *quinquevulnera;* each petal of this catchfly campion having a spot near its insertion the colour of a drop of blood. Near Bordeaux harbour I was shewn luxuriant clumps of *Brassica adpressa;* also the extremely rare *Lavatera sylvestris;* that Tree Mallow to which the London Catalogue assigns only one habitat. The *L. arborea* is not uncommon on various parts of the coast. I never saw it growing more than five feet high in Guernsey, but its velvety leaves form a large clump of dark green foliage, and always in some barren place, often overhanging a bluff of sand and pebbles marking the position of some former sea beach. There is plenty of evidence inland in Guernsey of these raised sea beaches. I saw one that was exposed by a road cutting, quite inland, and about fifty feet above the present sea level.

Between Bordeaux and L'Ancresse I was shown another plant peculiar to these islands, *Gnaphalium luteo-album ;* it was growing by the side of a dusty high road, and was nearly a foot high. What curious habits some plants have. They are very like some human beings. These Cudweeds are like the tramps, preferring the dust and dirt of a beaten high road, when there are nice clean fields just over the wall. Then look at the Michaelmas Daisy, how it revels in mud, sticky black mud—covering itself completely, all except the purple-rayed yellow-eyed flowers, which offer strange contrast to the mud surrounding them. Then, the sturdy thistles, fit emblems of the Scotsman with his fearless motto 'Nemo me impune lacessit.' While the pure flowers of mountain saxifrages seem to point to those refined beings, who, though on the earth are not of the earth, but keep themselves uncontaminated from all the dirt around them, breathing the higher air, and dying when removed to lower spheres. I must mention a few other plants, though a bare recital of names is uninteresting enough, and not always profitable. *Achillea ptarmica*, the common Sneeze wort is unknown here. The sweet *Alyssum*, the maritime form, occurs in a few places on the coast. At Cobo I found a few plants of the French Marigold, *Calendula officinalis*, which though not native, had evidently not known cultivation for generations.

In Alderney and Jersey, I found the spotted Rock Rose, *Helianthemum guttatum*, each small orange petal having a deep red spot near the base. These flowers were quite as fugacious as those of the commoner cistus. In damp meadows I often saw feathery tufts of the handsome Cypress Sedge, *Cyperus longus ;* and in St. Ouen's Bay in Jersey, found the *Scirpus pungens*, which grows only there. It looks like a miniature Sea-club-rush, and is of a beautiful soft brown colour. Both *Snapdragons* are common in cultivated ground, the greater one choosing old walls and gardens, the smaller preferring the open fields. Roses, the islands are very deficient. The Yellow Bartsia, *Bartsia viscosa*, is often met with, and grows in one damp place over two feet high. Of other plants of its natural order, I saw the Moneywort, *Sibthorpia europæa*, *Scrophularia scorodonia*, and two Mulleins, *Verbascum thapsus* and *nigrum*. Some of the sea cliffs are clothed with the Privet, straggling over the rocks and bearing large fruit. No escape from cultivation here. And near it flourishes the hairy form of the Mouse-ear Hawkweed, *Hieracium pilosella* var. *peleterianum ;* a much larger and more handsome plant than *H. pilosella*. *Prunus insititia*, the Bullace, grows in hedges and about the cliffs, the fruit was ripe, and marvellous in size and quantity, looking good enough to eat, but it would need a hungry man with leather-lined digestive organs to take more than one. Babington's and one or two other rare Leeks, grow on the cliffs below Fort George ; and hard by are many plants of the

Knee-Holly, *Ruscus aculeatus*. *Dianthus prolifer*, the Pink with flowers nearly hidden by brown membrane, I found on the shore near La Corbière in Jersey, a rare plant it is, but not beautiful.

There are six hundred and thirty-six species of flowering plants, eighteen Ferns, and nine Fern Allies, at present known in Guernsey. But time prevents me telling you any more about them. You must go yourselves, and see them growing in their beautiful island homes,—the resort of the Souls of the Blest, according to an ancient Norman legend.

Birkenhead.

Obituary.

JAMES BATTY.

JAMES BATTY, of 65, Fawcett Street, Sheffield, died on October 14th, aged 62 years. He was an excellent type of the working-man Lepidopterist, and the last surviving practical worker of the old Sheffield Entomologists' Club which comprised many excellent naturalists 30 and 40 years ago.

Batty had an excellent knowledge of larvæ and was the discoverer of the larva of *Tapinostola elymi* and *Celæna haworthii*. He was a regular correspondent of the late Mr. Wm. Buckler and the late Rev. Joseph Hellins, and used to keep them well supplied with material for description. He was also a good Micro-Lepidopterist and has left a fairly typical collection of *Tortrices* behind him. Apart from these he kept no collection, having sold his years ago, to, I believe, Mr. J. B. Hodgkinson, of Preston. He then gave up his hobby till a few years ago, when he re-commenced to exchange for species he either had not seen before or was not familiarly acquainted with, but two years ago he started his small collection of the *Tortrices*.

He will be much missed by the writer as they have been hundreds of excursions together. He (the writer) is requested by the family to ask if anyone having any claims for boxes, &c., will make them direct to him. A. E. HALL, Norbury, Sheffield.

AMMOPHILA LUTARIA, FAB.

An addition to "The Lancashire and Cheshire List of Hymenoptera Aculeata."

With the kind assistance of Mr. Bignell, of Plymouth, I am able to add this species to our List by the capture of a female, on the Blackpool Sandhills one July day in 1892.—C. E. STOTT, Bolton-le-Moors.

THE PTEROPHORINA OF BRITAIN.

BY J. W. TUTT, F.E.S.

(Continued from p. 222.)

Aciptilia, Hb.

This genus is fairly well represented in Britain there being five species, none of which are rare, although *A. spilodactyla* must be considered as very local. There are altogether twenty-five species in the Palæarctic region according to Staudinger's "Catalog," exclusive of *Trichoptilus paludnm* and *siceliota* whilst the Nearctic region boasts as yet only of four species of which one is doubtful. It can in no way be looked upon as a northern genus as only two species are known in Scandinavia, *viz.* :—*tetradactyla* and *pentadactyla.* The following is Wallengren's diagnosis of the genus :—"*Aciptilus*, Hb.—Antennæ finely ciliated, with the basal joint thickened. Forehead obtuse, the feathers forming no conical eminence. Palpi rather shorter than the head, slender, pointed, the last joint bending downwards. All the tibiæ slender, and not thickened, the spines of the posterior tibiæ unequal. Anterior wings cleft almost to the middle of their length, the segments of all the wings slender, linear, and evidently without angles. Inner margin not toothed, the segment of the posterior wings without black scales in the fringe. Anterior wings flat, with the margins only very slightly deflexed. Veins of the anterior wings five in number, simple ; the 1st to the 3rd arising from the base and running to the posterior segment, the 4th and 5th also springing from the base and going to the anterior segment. The 1st, 2nd and 5th veins more slender than the others. The veins of the posterior wings are four ; the 1st from the base into the first segment, the 2nd from the base into the middle segment and the 3rd and 4th from the base into the third segment, the 3rd and 4th veins are more slender ; the 2nd sometimes sends off a very fine branch towards the fissure. Cells of the wings, none" (Jordan, "Entomologist's Monthly Magazine," Vol. VI., p. 150). Of the genus *Aciptilia* Dr. Jordan writes :—"The Scandinavian species of this genus are only two, namely, *Aciptilus tetradactylus* and *A. pentadactylus.* The larva of *tetradactylus* is said to feed on *Thymus serpyllum*, in May and June. In Britain, we fortunately have several more of this genus, *viz.*, *A. galactodactylus*, *A. spilodactylus*, *A. baliodactylus*, *A. tetradactylus* and *A. pentadactylus.* *Paludum* certainly does not belong to it, the much longer palpi and the slightly thickened tibiæ would be quite enough to distinguish it. The only insect known to me in this group as likely to pass in our cabinets undetected is *xanthodactylus*, which might be overlooked as a variety of *baliodactylus.* It may be known by its having a spot on the inner margin of the anterior wing, opposite the one on the outer margin, as well as a spot at the fissure" ("Entomologist's Monthly Magazine," Vol. VI., p. 150). The same writer says of the American species in this genus:—"In the genus *Aciptilus* there is a great falling off in the number of species as compared with those of Europe, and in these there is an evident tendency to an aberration from the type-form. Three species are given (by Lord Walsingham), all of which are now before me: two of these seem undoubted *Aciptili*, the first, *A. cinerascens*, Wlsm., is very similar to *L. lienigianus* in colour and size, the other, *A. montanus*, Wlsm., is about the size of *A. paludum*, but is white with brown scales, and a costal streak of the same colour; the third, *A. californicus* is a most remarkable insect, with the wings of an *Aciptilus* but the colouring of an *Oxyptilus*, and with the same 'tuft of projecting scales in the fringes of the third lobe of the hind-wings.' Our author (Lord Walsingham) says:—'Its nearest European ally is *A. siceliota*, Zell.' The three *Aciptili*—*A. paludum*, *A. siceliota* and *A. baptodactylus* have very much in common with each other, so that they at least form a very distinct section of *Aciptilus*, and certainly there is much resemblance to this species in the group, but none of them have the tuft of projecting scales. Although the inferior lobe of the fore-wings in *Oxyptilus* is truncate, with a concave margin, yet this is not equally shown in all species, it reaches its greatest development in *O. didactylus* and *O. ericetorum*, also in *O. ningoris* of the present work ("Pterophoridæ of California and Oregon"), but it is much better marked in *O. kollari*, and still less so in the *O. rutilans* of St Helena; none of them have, however, the simple pointed feather of an *Aciptilus*, such as is found in *A. californicus*. It is an undoubted link between *Oxyptilus* and *Aciptilus*, and very possibly may hereafter modify the classification of the plume moths" ("Entomologist's Monthly Magazine," Vol. XVIII., pp. 119—120).

Aciptilia tetradactyla.—This is one of the original *Linnæan* species, and appears to have a very considerable range of distribution.

Synonymy—*Tetradactyla*, Linn., 'Faun. Suec.', No. 1455, pp. 370—371; Tr., IX., 2, 255; Haw. 477; Dup. XI., 314, 6; Stphs., 'Ill.', IV., 373; Zell. 'Isis' (1841) 862; 'Linn. Ent.' VI., 394; H.-S., 35, V., p. 385; Frey, 419; Sta. 'Manual,' II., p. 444; Tutt, 'Ent. Record,' I., p. 91. *Tridactyla*, Linn., 'Sys. Nat.', X., p. 542; XII., p. 900; Haw, 'Lep. Brit.', 477 (=♀). *Leucodactyla*, Hb. 5. *Didactyla*, Scop., 'Ent. Carn.', No. 672. *Niveidactyla*, Stephs., 'Ill.', IV., 373. The synonymy of this species is difficult and not at all easy to work out. Writing of this matter in 1890 I said:—"*Tetradactyla*, Linn. and *tridactyla*, Linn.; *tetradactyla*, Haw. and *tridactyla*, Haw.—About the species *tetradactyla* and *tridactyla* of Linnæus, there is, as Mr. Stainton pointed out ("Entomologist's Monthly Magazine," Vol. I., p. 12) some difficulty. The Linnæan species *tetradactyla* of the "Fauna Suecica," pp. 370—371, is without doubt the species we know by that name. This description is:—"Alæ superiores lineares; linea alba, longitudinali, ut soli margines, obscuriores, immaculata, Pedes albi." The "linea alba" is most characteristic of ♀ *tetradactyla* but in the "Systema Naturæ," both 10th and 12th Editions (10th, p. 542, 12th, p. 900), *tetradactyla* gets a fresh description "*Alucita* alis patentibus fissis flavescentibus," which fits our species nowhere; but to muddle matters, the *tetradactyla* description of the "Fauna Suecica" is applied to a new species *tridactyla*, and, therefore, the *tridactyla* of the "Systema Naturæ" becomes synonymous with *tetradactyla* of the "Fauna Suecica," both representing our *tetradactyla*. The difficulty now remains—What is the *tetradactyla* of the "Systema Naturæ?" The "flavescentibus" is the puzzle. It might refer to the closely allied *baliodactyla*, but this is not a Scandinavian species, and therefore very improbable. It might be an entirely different species—"*osteodactyla*," or some other—or finally, it may be that Linnæus is practically correct, and that the *tetradactyla* of the "Systema Naturæ" is the ♀ of that species, as the ♀ is very different to the ♂, and is of an uniform dirty yellowish-white colour. Haworth, in the "Lepidoptera Britannica," p. 477, uses the Linnæan diagnosis for *tetradactyla* from the "Fauna Suecica," and afterwards adds the description (*vide* above) from the same work, and which, as I have before said, is most distinctly our *tetradactyla*. But we have to remember (as also I have pointed out) that this species is sexually dimorphic, that the male has dark costal and inner margins with a longitudinal white line, while the female has the anterior wings entirely whitish. Linnæus may have (as I have previously stated) described the sexes as distinct; Haworth, I think, certainly did. Haworth (quoting Fabricius) describes *tridactyla* as:—"*Alucita*, alis fissis; anticis bifidis albis, posticis tripartitis fuscis, Fab.," and then adds:—"Parvus, distinctis alis, posticis trifidis fuscis" ("Lepidoptera Britannica," p. 477). This I consider a very fair diagnosis of the female *tetradactyla*" ("Entomologist's Record" etc., Vol. I., p. 91).

IMAGO—This pale bone-coloured species has the anterior wings divided into two lobes, the apex pointed; dusted with ochreous-grey along the costa so that it is a rather duller looking insect than its ally, *baliodactyla;* the ochreous-grey dusting along the costa is continued along the inner margin thus leaving a pale longitudinal line extending throughout the central area of the wing. There is also a dark blackish shade on the costa of the upper lobe. The hind-wings are divided into three plumules and are of a grey colour. The hind-wings are uniformly dark grey. The ground colour of the fore-wings of the female is almost white throughout and without the dark shadings characteristic of the males. The female has a much smaller wing expanse than the male. Stainton's diagnosis is:—"9'''—10'''. Fore-wings whitish, more yellowish towards the costa; the costa of the anterior lobe blackish-brown to the tip. VII.—VIII." ("Manual," II., p. 444). The original Linnæan description is as follows:—"*Alucita* alis patentibus fissis flavescentibus" ("Systema Naturæ," 10th, p. 542, No. 303). In addition to this we find:—"Alæ superiores lineares; linea alba, longitudinali, ut soli margines obscuriores, immaculata. Pedes albi" ("Fauna Suecica," No. 1455, pp. 370—371).

LARVA—Mr. Porritt has given a most complete description of the larva of this species, although he unfortunately failed to rear the moths from them. He writes:—"Early in the season of last year (1885*) Mr. Eustace R. Bankes, of Corfe Castle, found a larva on wild thyme, from which he bred a specimen of *Pterophorus tetradactylus;* so, knowing my want of the species, he this year very kindly made a special search for it, the result being that on May 20th I had the pleasure of receiving three specimens from him, together with several healthy growing plants of the thyme on which to feed them. Length when full grown, about half an inch, and of ordinary *Pterophorus* shape, *i.e.*, plump, stoutest in the middle, attenuated at the extremities, rounded above, flatter beneath; head small and glossy, considerably narrower than the second segment; a tuft of short hairs springs from each tubercle. Ground-colour bright pea-green, when younger (*i.e.* previous to the last moult) having a yellowish tinge; head yellowish-green, the mandibles and a spot on each side of them, brown; the broad dorsal stripe is of a considerably darker shade of green than the ground-colour and is powdered on each side with greyish-white subdorsal stripes of the same dark green colour but not so conspicuous; spiracular stripes rather broad; yellowish-grey segmental divisions and hairs white. When younger the segmental divisions are yellowish-grey. Ventral surface, legs and prolegs uniformly of the bright pea-green of the dorsal area. I bred no imagos as the larvæ came to grief during my absence in London; but in this case it did not much matter for Mr. Bankes having fortunately reared the imago from a similar larva the previous year, had thus made sure of the species. Apart from that, they were too large for *P. parvidactylus*, the other thyme-feeding species, which, moreover, Mr. Bankes believes does not occur in the district" ("Entomologist's Monthly Magazine," Vol. XXIII., p. 112). Mr. Bankes writes:—"I first found a larva (which produced the moth referred to by Mr. Porritt) of this species in 1884 and two years later sent Mr. Porritt three larvæ for description. I do not know the exact date when I found the larva that produced the moth, but as the imago emerged on June 30th, 1884 (Mr. Porritt in the "Entomologist's Monthly Magazine" wrongly refers to it as 1885), the larvæ was almost certainly found in the middle or at the end of May and would have pupated in the first half of June. The larva feeds exposed on the leaves of wild thyme, which it so closely resembles in colour that it is not easy to see. The larvæ that I sent to Mr. Porritt in 1886, were found on May 18th. I only got three of them and they were well-grown at that date" *(in litt.* December 22nd, 1892.")

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* This should be "1884" not "1885" *vide* Mr. E. Bankes' notes further on.

Pupa—Practically nothing is known about the pupa, but Mr. Bankes speaking from memory says:—"I feel practically certain that it was uniformly green like the larva and was of the ordinary *Pterophorus* shape. It certainly pupated among the sprigs of wild thyme and I believe it attached itself to one of the sprigs" *(in litt.)*.

Habitat—I have always found this species rather abundantly on the chalk hills of Kent, where it can be disturbed from the tall herbage during the day, but flies naturally at dusk. It has a much wider distribution than *baliodactyla*, the following list occurring in Stainton's "Manual":—"Alkham, Bristol, Cambridge, Darlington (common), Lake District, Lewes, Newcastle-on-Tyne, Pembury, Scarborough (very common), York." I have found it abundant all round Strood (on the chalk), at Folkestone and Dover, but it is very rare at Kingsdown. Mr. W. F. de V. Kane records this species from "Galway" *(in litt.)*, but I have seen no Irish specimens. Mr. Porritt gives "Witherslack" *(in litt.)* but it is a species more rarely recorded outside the South and South-eastern Counties of England, than one would expect. It is common at Black Hall Rocks near Hartlepool, on limestone. Its range as given by Staudinger and Wocke is as follows:—"Central and Northern Europe (except the Polar region), Carniola, Spain, Russia (South and East), Armenia and Bithynia" ("Catalog," p. 345).

Time of Appearance—This species appears to be on the wing from about the middle of June until the end of August. In that late year 1888, I took it during the first week in September. There are apparently not two broods, but a succession of emergences as in the case of *spilodactyla*. The first week in August, however, is usually the best time for it.

General Notes.

The End of the Season in Aberdeen.—It has been an exceptional end of a year here for some species. During the first two weeks of September I was taking among others at sugar, *Nigra*, *Suffusa*, *Exoleta*, *Vetusta*, *Rufina*, *Litura*, *Meticulosa*, *Ferruginea*, *Macilenta*, *Nictitans*, *Solidaginis*, and *Glarcosa*. I have been collecting since the Spring of 1890 and never saw any of these before except one or two *Glarcosa* and a few Sword-grasses in the Spring, never before in Autumn. On the other hand I have not seen several species that used to occur freely, such as *C-nigrum*, *Basilinea*, *Tenebrosa*, *Orbona*, and *Rectilinea*. The latter was common last year and I worked hard for it this year but only got five or six, and those of little use. I have only seen one *Aglaia*, and one larva of *S. populi*. I have not seen any "Puss" larvæ, and only one "Fox"; I could have taken hundreds on the same ground last year. Stranger still I did not see a single Fox moth this summer, nor did Mr. Mackie.—A. D. CONNON, Pitcaple.

HYBERNIA PROGEMMARIA IN NOVEMBER.—On 16th November I found a female *H. progemmaria* busily depositing its eggs on an iron railing in front of a house in our road. No doubt the past most peculiar summer, and long continuance of hot weather has induced the poor thing to appear now instead of in spring.—B. W. NEAVE, Brownswood Park, N.

[It would be interesting to know if the eggs were impregnated, as this would show that males also had emerged out of season.—ED. B.N.]

NYSSIA ZONARIA.—In the "British Naturalist," Vol. II., p. 104, Mr. Robson records a successful expedition on April 11th, 1892, with my brother, to Crosby, under Mr. Gregson's guidance, after *Nyssia zonaria*. From specimens taken on that occasion my brother got eggs, a few of which I tried to rear, the rest being turned away. The larvæ I fed upon Sallow, as they refused Yarrow and other plants. About a dozen moths duly made their appearance the following March, but some pupæ laid over. From one of these, a female specimen emerged on November 4th. I do not remember any previous Autumn record even in confinement.—T. H. BRIGGS, Surrey House, Leatherhead, November 6th, 1893.

NEW BIOLOGICAL MAGAZINE.—A new Quarterly Magazine, "The Journal of Marine Zoology and Microscopy," edited by Mr. James Hornell, of Jersey, made its first appearance in November. It calls itself "A plainly worded Biological Quarterly," and taking the first part as a sample, it fully bears out this sub-title. The whole of the articles in the first part are most interesting reading, even to those who know nothing of the creatures spoken of, and, while the sense is never obscured by the use of unintelligfble words, they are strictly and technically correct. The annual subscription is only two shillings and I cordially recommend it to my readers.—JOHN E. ROBSON, Hartlepool.

Editorial.

For the past fourteen years it has been my great pleasure to conduct this Magazine and its predecessor "The Young Naturalist." It is with regret I have to announce that the publication will be discontinued with the present part. For the past six months I have not been well enough to perform the duties of an editor at all satisfactorily, nor to keep up the very extensive correspondence such a publication entails. My Assistant Editors, most of whom would willingly have assisted me, reside in other places, and the letter writing necessary to obtain their aid, often entailed more trouble than the work that could be transferred. The end of the Volume afforded an opportunity of discontinuing the publication, which I felt bound to embrace, as I might not be able to carry another through to the end.

Mr. Dale's papers on "The British Hawk Moths" are completed, and, as only a page or two of those on "Bombyces" have appeared, that supplement may be considered complete.

It is much to be regretted that the "Hand Book of British Spiders" must be left in its present unfinished state. The author, however, hopes to continue its publication separately. Those who desire to receive further parts must communicate direct with the Rev. Fred. O. Pickard-Cambridge, 5, Henry Street, Carlisle.

The important work on the "British Pterophorina," by Mr. J. W. Tutt, Editor of the "Entomologist's Record," is nearly completed, and, as the remaining papers have to be printed for separate issue, I will be glad to forward a copy free to any subscriber who will send me an addressed cover. They can then be bound up with this Volume.

I am also sorry I am unable to complete the publication of the observations on Sugaring made during the past season. Some of the Autumn records are very surprising. As soon as I am able, I will endeavour to tabulate the whole of them, and see whether any useful deductions can be drawn therefrom. Mr. South, the Editor of the "Entomologist," has most kindly intimated his willingness to publish these summaries for me.

I must now draw these final remarks to a close. I have endeavoured to conduct the Magazine in an impartial manner, and in all controversial subjects to allow both sides alsolute fairplay. I have also striven to avoid personalities. It is a pity when scientific subjects cannot be discussed without bad feeling. If I have failed in these respects I can only express my regret.

In conclusion, I must thank the large circle of subscribers, and especially of contributors who have aided me so willingly during these fourteen years. It would be invidious to mention names. Several whose communications appeared in the first volume, have continued to contribute to its pages during the whole period of its existence. With many our correspondence has ripened into a warm personal friendship. I most sincerely trust the discontinuance of the publication will neither cause a cessation of the correspondence nor a diminution of the friendship. Yet I lay down my pen with much reluctance, feeling as if I were parting with many dear friends. But the last words must be said, however much I may be inclined to linger over them, and with repeated thanks to all, subscribers as well as contributors, I am, yours very truly,

JOHN E. ROBSON.

Hartlepool,
November, 1893.

NATURAL HISTORY

EXCHANGE.

Exotic Scolytidæ.—Having acquired the celebrated collection of Bark Beetles, *Scolytides*, the largest in the world, of the monographer, Dr. Eichoff, I wish to obtain, by purchase or otherwise, all exotic *Scolytidæ* not classified, coming with orignal sendings, Director Camillo F. Schaufuss Meissen, Saxony.

Exchange.—Corneum, Anatina, Contecta, Leachii, Piscinalis, Nautileus, Cornea, Contortus, Hypnorum, Glutinosa, Stagnatis, Palustris, Fluviatilis, Putris, Elegans, Alliarius, Crystillinus, Cantiana, Caperata, Erictorum, Umbilicata, Lubrica, &c., &c. Desiderata—Lepidoptera or Birds' eggs.—J. W. Boult, 17, Finsbury Grove, Fountain Road, Hull.

Duplicates—Fine Blandina, Cassiope, Edusa, Aglaia, Adippe, Sibylla, Coryli*, Cursoria, Carmelita*, Cordigera, Conflua (Shetland), Porphyrea, Dipsaeeus, Pincta*, Curzoni, Immanata, Trepidaria, Carbonaria, Pinetaria, Ruficinctata, Cæsiata, Lobulata, Limitata, Didymata (Shetland), Testata. Populata (vars.), Blomesr, Cambricaria, Argentula, Osseana, Duplana, Alpinalis, Furcatellus.—J. Maddison, South Binley, Durham.

British Birds Eggs, Side blown with Data. Duplicates—Spotted Flycatcher, Song Thrush, Blackbird, Hedge Sparrow, House Sparrow, Tree Sparrow, Robin, Winchat, Sedge Warbler, White-throat, Pied Wagtail, Skylark, Yellow Bunting. Chaffinch, Greenfinch, Starling, Jackdaw, Swallow. Land Martin, Stock Dove, Partridge, Red-legged Partridge, Lapwing, Land Rail, Moorhen, Guillemot, Lesser Tern. Desiderata—Many other birds' eggs.—C. Couldwell, 1, Park Avenue, Cane Street, Hull.

Coleoptera—Duplicates—Helops pallidus, O. atroapterus, Apion carduorum, ononis, Ceuth. litura, Apion virens, &c.—B. Tomlin, The Green, Llandaff.

Duplicatees—Filigramaria, Zonaria, Chi, Ulmata, Didymata, Glauca, Festucæ. Desiderata—Numerous local series.—J. W. Baldwin, 472, Darwen Rd., Dunscar, Nr. Bolton.

Duplicates—Corynetes rufipes, C. ruficollis, Nitidula bipustulata, Habrocerus capillaricornis, Ocypus ater, Rhyncolus cylindrirostris, Aphodius fætens, A. nitidulus, Bembidium ephippium, Dermestes undulatus, Anthicus instabilis, Thyamis distinguenda, Lithochara brunnea, Amara convexiuscula, Hopatrum sabulosum, and nearly 500 others. Desiderata—numerous.—A. Ford, Glen Mont, Braybrooke Road, Hastings.

Duplicates—Edusa (few ♂), tages, alveolus, sylvanus, trifolii (vars.), puta (light and dark), suffusa, nictitans (vars.), furuncula, chenopodii, meticulosa, xanthographa (vars.), [illegible] glyphica, mi (few) and odd [illegible] many more. Desrderata—numerous, especially [illegible] Northern species.—A. [illegible], Glen Mount, Braybrooke Road, Hastings.

Duplicates—Edusa, corydon, [illegible], tipuliformis, hirtaria, citraria, rupicapraria ( ), defoliaria (♀), vulgata (bred, dark London forms) assimilata, bipunctaria, [illegible]lens, lithargyria, testacea, furuncula, literosa, blanda, puta, suffusa, nigricans, N. rubi, c-nigrum, perla, capsincola (a few, bred), libatrix. Pupæ of alchemillata. Desiderata—very numerous; especially, obfuscata, simulata, trepidaria, tristata, albicillata, fumata, salicata.—Louis B. Prout, 12, Greenwood Road, Dalston, N.E.

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TO CORRESPONDENTS.

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NATURAL HISTORY

ERRATA.

Line 1, page 1—*Monacha* for *Monarcha.*
,, 9, ,, 1—*Zatamatic* for *Zataminatic.*
,, 36, ,, 2—*fourteen in number* for *four in number.*
,, 13, ,, 21—*Dasypolia* for *Dasypotia.*
,, 6, ,, 99—*Celandine* for *Celendine.*
,, 9, ,, ,,—*Butterbur* for *Butturbur.*
,, 15 ,, 108—*a better scope* for *a nobler aim.*
,, 3, ,, 137—*eruciformis* for *cruciformis.*
,, 16, ,, 140—*Potamogeton* for *Potamogaton.*
,, 19, ,, 260—*Except* for *exept.*
,, 26, ,, ,, —*Orthoptera—Acrididæ* for *Osthoptera—Acriolidæ.*
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,, 23, ,, ,, —*jurtina* for *justina.*
,, 24, ,, ,, —*quadro* for *guadea.*
,, 26, ,, ,, —*sannio* for *pannio.*
,, 45, ,, ,, —*Scatophaga* for *Statiphaga.*
,, 13 & 34 ,, 253—*pseudopods* for *pseudopeds.*

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A POPULAR MAGAZINE
OF
GENERAL NATURAL HISTORY.

EDITED BY

JOSEPH SMITH, F.R.S.A., M.R.I.A., F.L.S.,

AND

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BRIT. MUS. 15 JUN 29 NAT. HIST.

EDITORIAL.

The present occasion is one which the Editors avail themselves of to begin a new series of *The British Naturalist*, and it likewise offers a favourable opportunity to the student and others interested in Natural History of commencing with the issue of the first part of the New Series.

The British Naturalist, being a magazine open to consider contributions relating to Natural History from all those interested, will, it is hoped, become the medium for a general interchange of ideas in such subjects; while it will afford opportunities for scattered workers in science to compare the results of their labours.

It is with pleasure the Editors are enabled to announce that during the year contributions from the following well-known gentlemen will appear in the pages of the Magazine:—Professor A. H. Young, F.R.C.S., &c., of Owens College; Charles White, Esq., Dr. Bowden, Dr. Langdale, Messrs. Billups, A. J. Jolley, C. S. Gregson, R. Newstead, F.E.S., J. E. Robson, F.E.S., and George Swainson, F.L.S., &c., &c.

Mr. C. W. Dale, F.E.S., will write on the "Sexual differences in Insects;" Mr. J. P. Soutter will contribute a series of short articles on Cleistogamous Flowers; and the very valuable entomological papers on the British Pterophorina by Mr. J. W. Tutt, F.E.S., are being continued in the present issue; while students and collectors of Coleoptera will be pleased to learn that this class of insects will receive attention at the hands of our esteemed contributor, Mr. G. A. Lewcock, London.

The Rev. F. O. P. Cambridge has kindly consented to continue his valuable Monograph on Spiders, which will appear from time to time as a supplement to the magazine.

The subject "Early Man" will also receive attention; and a series of articles on "Spiders: their structure and place in nature," will shortly appear.

The Editors will be pleased to receive and record notes from observers of Nature; they will also gladly welcome contributions from other Naturalists, and, while sustaining the reputation for fair play in controversy which has ever been a feature of the Magazine in the past, its columns will always be open to the amicable discussion of all questions relevant to the study of Natural History.

THE EDITORS.

Warrington, January, 1894.

THE
BRITISH NATURALIST.

NEW SERIES.

WHAT CONSTITUTES A BRITISH INSECT AT THE PRESENT TIME?

BY C. S. GREGSON.

Some time ago, I had a specimen of a dark variety of *Monarcha* presented to me by an esteemed correspondent, presumably as a British insect, and I placed it in my new collection, feeling very grateful for it. Very shortly afterwards, I learned so much about its parentage, that I turned it round, to indicate my doubt that its father was a Britisher!!! Later, I heard of the breeding of a magnificent form of *Lubricipeda* at Barnsley, and wrote a friend there, to look well after all the weedy gardens around for *Lubricipeda* larvæ, which he did, but no varieties were bred! Then I heard that the larva from which the original Zataminatic form was bred was collected in Leicestershire, *not Yorkshire*, and next authoritatively that *it* was bred either from larvæ sent from *London* or from *Grimsby!* Later, being an invited guest at the Lancashire and Cheshire Entomological Society, a magnificent pair of what I thought *Zatima* were exhibited, and later in the evening I was privately told that the specimens had been produced by careful inter-breeding from a *specimen* bred accidentally at Barnsley, amongst other ordinary forms.

I did not, however, ascertain the sex of the *single specimen* bred, and I went home wondering how it was we were told at the meeting, that all the progeny from that single British specimen appeared exactly like continental *Zatima* (*it must* have been paired with an ordinary form of *Lubricipeda*), because *it was a single specimen bred in a box*, not caught at large, where it might be supposed to have paired with one of its own like. However, as one of my good friends writes me, he has already bred many specimens of it, *like producing like*, and as he now has a considerable number of pupæ crossed with the ordinary *Lubricipeda*, we—or shall I say I?—await with great interest the results of this crossing, since in all my experience I never bred a brood of insects inheriting the characteristics of one or other parent only. Leaving this so-called case to stand on its own merits, we come to ask, has it been a case of "blown over" whilst its reputed homes were at Barnsley, and in Leicestershire; that was hardly likely, but at London and Grimsby it is quite feasible that it might have been carried over in or on a steamboat accidentally, or otherwise, but if so, is it a British insect?

I have recently been shown a number of specimens of *Polia Xanthamisia* (Hb.), all of which were purchased because they were said to have been bred from eggs laid by a female captured in the Isle of Man. They are exactly like *P. Xanthamista*, (Hb.) in my Continental collection (from the south of France). *I have never seen any like these from the Isle of Man!* I have, however, German specimens of *Nigrocincta* in my Continental collection, which it would be difficult to separate from some Manx specimens of *Nigrocincta* (Tr.), whilst these Xanthamistic specimens are generally larger and broader than I have ever seen *P. Nigrocincta* to be from the Isle of Man; and they have a peculiar general appearance, especially in the larger females (which I cannot describe unless I coin a word), as if they were "ephronized." Yes, dusted with very dark scales. I have seen some letters guaranteeing that the moths were bred from eggs deposited by a female captured in the Isle of Man, but no name of the fortunate captor is given; only the number of eggs laid by that Order (I think, 280,) and the breeder's name. I have a long and most interesting letter from a gentleman who purchased 100 of the eggs for five shillings, thinking they had been deposited by this so-called Manx female. All the specimens of Manx *P. Xanthamista* (Hb.) shown to me (four in number) are "poorly," that is, irregularly pinned with slender foreign made pins, black, and are not well set, English style. They were bought at one shilling each, a price no one should expect to purchase *Manx P. Nigrocincta* at.

Should we call these species "British insects," simply because we are told they were produced from eggs laid by a female taken in the Isle of Man (?), when the progeny themselves are so different in appearance to any Manx species ever bred from eggs or larvæ found there?

THE GEOLOGY OF MILLER'S DALE.

BY D. S. STEUART.

The dale is situated in the north-west of Derbyshire, and a little to the east of Buxton, whence it may be reached in a few minutes *viâ* the Midland Railway. The outlines of the district are mostly smooth and undulating, with gently rounded slopes, giving the landscape a somewhat tame and monotonous appearance. These features are apparently the effect of river and atmospheric action on the Millstone Grit, a composition of hard coarse sandstone interlayered with alternate beds of shale and softer sandstone; resulting in the formation of long unbroken slopes gradually inclining in the direction of the dip, and terminating in cliffs or "edges" overlooking broad valleys, which the streams at the bottom have hollowed out from the soft shale beds beneath.

No sooner, however, do we come to inspect the limestone "valleys," than we are at once struck by the contrast they offer to those of the Millstone Grit; indeed the word "valleys" is in this case misleading, we should rather substitute the words "dales" or ravines, many of which are of wild picturesque beauty, especially the one in question.

For here the river has in many places cut and worked its way through the solid limestone, its erratic and winding course bounded on either side by steep weather-worn cliffs, clothed and beautified with innumerable shrubs and bushes, and luxuriantly carpeted with ivy and other creeping plants, a pleasing relief from the monotonous grey of the limestone rocks. Having obtained some idea of the lie of the land, let us now consider the agents which have been at work in bringing about these changes, and the way in which they have accomplished them. The chief constituents of the dale are the igneous rocks "Dolerite" and "Toadstone," probably a corruption of the word "Todstein" (*lit.* dead-stone), called by the miners "channel," and the "Carboniferous Limestone," which latter occurs in immense quantities, attaining in places a depth of 5,000 feet and rising as high as 300 feet, frequently intersected with beds of igneous rocks and shales.

The Limestone itself is chiefly composed of calcium carbonate or calcite, and a double carbonate of calcium and magnesium called "dolomite." It belongs to the carboniferous and coralline Limestones, containing large numbers of corals and other fossils, conspicuous amongst which are the "crinoids" or sea-lilies, with long jointed columns supporting a simple or complex cup surrounded with well-developed arms, reminding one somewhat of those of a starfish.

These vast beds of limestone were formed long æons ago down in the depth of the ocean, by the continual accumulation of carbonate of lime supplied in the form of shells, foraminifera, and other marine bodies; and the same action is still going on at the present day, as is clearly seen on comparing specimens of the Atlantic ooze, with those of our chalk and limestone cliffs, their microscopical constituents bearing a very striking resemblance.

With regard to the "igneous" rocks, the term "igneous" is applied to those rocks which have solidified from the molten state under the earth's pressure, as opposed to the "volcanic" rocks which have been ejected on the surface; there are, nevertheless, intermediate stages, which sometimes render it impossible to draw the line.

The specimens in question, however, belong to the igneous group, the outcome of a flood of molten rocks poured over the original bed of limestone, which in due time was succeeded by a second layer, thus covering the igneous rocks, and so accounting for their presence in the midst of the limestone, the point of contact in the latter being marked by an alteration in its composition, and the destruction of any crystalline structure present, owing to the baking and consolidation of the molten rocks. Nor do the shales remain unaffected, for in those strata lying on or under the toadstone, the calcined clay is burnt like a brick to the depth of nearly a foot.

In the process of cooling, steam and probably other gases have been imprisoned in large quantities, forming innumerable small bubble-like cavities in the upper part of the rock, many being now filled up with calcareous sediment, etc.

The rock itself is of a blackish brown colour, and extremely hard, invariably calling into play the indispensable hammer, which the geologist must wield with no light arm, if he intends to inflict any damage on its, apparently, almost indestructible surface, offering, nevertheless, but a vain resistance to the rain and wind, which latter fact brings us to the consideration of the important relations these forces bear to the general features of scenery.

As we stand at the bottom of the dale, glancing up at the tall walls of grey limestone, and then at the stream beneath, we are struck by the peculiar angles at which it has carved out its course, some of them being well-nigh acute; and, we at once ask, is there no way of explaining the phenomenon? An explanation there is, depending upon two facts, the importance of which cannot be overrated.

(I) That water in which carbonic acid gas is dissolved becomes invested with a new property, being able to dissolve up limestone.

(II) That the limestone and, indeed, most other rocks have what are technically called "joints," or certain lines of weakness in their structure, such that any force like that of a river would first render its effects visible along these lines. This is precisely what we meet with here: the river having found out one of these lines, gradually excavates a course in that direction, exerting nearly equal pressure on all sides till, finding another line of weakness with a resistance inferior to that of the old line, it naturally flows in this new direction ; nor does it signify at what angle the new line lies, provided it is not in a higher plane than the old course. Knowing these facts, then, we have but to scrutinize the course of the dale in order to discover the different "joints" in the rock, which are to be met with in all stages of denudation, more or less prominent according to the amount they have been "weathered," *i.e.*, acted upon by the rain and aqueous vapours, etc., contained in the atmosphere. Different rocks have different ways of "weathering." A little reflection will enable us to grasp the fact that things were not always as we find them now ; the river and the valley must both have had a beginning. And so, Geology tells us they have, a beginning so different from their present state, that, until we thoroughly understand the explanation, we hardly like to credit the facts.

The whole of this deep valley was, at one time, nothing more nor less than a subterranean watercourse flowing through a bed of carboniferous limestone. But the waters of the stream, charged with the carbonic acid gas which they had absorbed from the air or picked up from decaying vegetable matter, dissolved, year by year, enormous quantities of the limestone rock, carrying it in solution to the sea, where, after passing through many strange changes, which we cannot for the present consider, it was finally deposited as part and parcel of a submarine bed of limestone or chalk, destined no doubt in the far distant future to appear again as *terra firma*.

In order to obtain some adequate idea of the enormous amount of solid material which is transported in solution from the land to the sea by rivers, we may quote that of the river Thames at Kingston, where no less than 584,230 tons of mineral matter, chiefly carbonate of lime, flow past every year.

By the internal erosion of the river, combined with the external action of the atmosphere, the roof of the watercourse is at length worn out, falling down into the bed of the stream, where, offering a greater resistance to the current, it soon becomes dissolved and washed away, leaving the river free to continue the deepening and widening of its bed, greatly aided by the action of the rains and winds, which can now act directly on the surface of its banks.

(*To be continued.*)

In Burtonwood, near Warrington (January 27), the Sallow is in bud, almost in flower. Hazel in full flower, male and female. This is very early.—A. J. J.

THE PTEROPHORINA OF BRITAIN.

BY J. W. TUTT, F.E.S.

(Continued from Vol. III., Old Series, p. 253.)

Aciptilia baliodactyla.—This and the preceding species *tetradactyla* are very closely allied, and *tetradactyla* appears at least in one respect to form a close connecting link with such *Leioptili* as *microdactyla*, in both of which species there is a distinct sexual dimorphic tendency strongly evident, although in *baliodactyla* the tendency in this direction is not at all strongly marked.

SYNONYMY—*Baliodactyla*, Zell., 'Isis,' (1841), 861; 'Linn. Ent. Zeit.,' VI., 393; H.-S., 36, V., p. 384; Frey, 418. *Tridactylus*, Stphs., 'Ill.,' IV., 373; Wd. 1634.

IMAGO—The anterior wings of *baliodactyla* are divided into two lobes, both of which are very acute and the lower slightly falcate, by a fissure extending half way to the base. The colour is of a pale ochreous; the costa, from the base to the point directly above the fissure being narrowly fuscous; the point of termination of this shade being sometimes sharply defined and making a dark costal blotch, another similar linear costal mark being found between this and the apex; in some specimens these costal marks are very inconspicuous, in others very distinct. What few markings there are in *baliodactyla* correspond in position with the better developed markings in *spilodactyla*. The moth has altogether a very clean appearance. The hind wings are of an ochreous tint, sometimes with a slight coppery hue and divided into three plumules. Stainton's diagnosis is as follows:—"11‴—1″.1‴. F.-w. yellowish white; a blackish line along the costa from near the base to beyond the middle, and a dark brown blotch in the costal fringes. VII." ("Manual," II., p. 444).

LARVA—The larva of this species is thus described by Mr. South:—"Length seven lines, tapering towards the anal extremity. Head smaller than second segment, yellowish-green; a small black spot on each cheek, and brown mandibles. Ground colour dingy green, segmental divisions and dorsal line yellowish-green. Tubercles, two dorsal rows (four on each side) whitish, with tufts of white hairs; subdorsal and spiracular rows, two warts on each segment, the anterior wart on each segment in both series is the longest, and one hair of the fascicle emitted therefrom is longer than the others. Prolegs and anal claspers transparent yellowish-green. Food, marjoram (*Origanum vulgare*). Eats the terminal leaves; generally to be found at rest in the day-time on a plant, the top of which the larva has caused to droop by biting into the stem. Feeds in the evening. June" ("Entomologist," Vol. XVI., p. 25).

PUPA—The pupa of this species is also described by Mr. South. He writes as follows :—"Colour dingy green, a broad dorsal stripe obscure red-brown; dorsal hairs and warts as in the larva; sometimes the whole of the dorsal area is suffused with red-brown. In this case, the wing-cases are pale green, and the antenna-cases either brownish-green or red-brown; fastened by anal segment to some portion of food plant, often to a leaf or stem of the withered top. July" ("Entomologist," Vol. XVI., p.26). Figures of all stages of this species—larva, pupa and imago, together with the food plant, are given in "The Entomologist," Feb., 1883. The figure of the imago is very poor indeed.

TIME OF APPEARANCE—The imago rarely appears until well into July. I remember this species and *tetradactyla* on one occasion being very abundant during the first week in August, when Mr. Ovenden and myself captured a large number. There is no doubt that during the last week in July and the first week in August the moth is most frequently taken.

HABITAT—The species appears to be almost entirely confined to chalk downs, where its food plant occasionally grows abundantly. In such localities it maybe sometimes taken in plenty. I have found it commonly in the daytime at Cuxton and in the Warren at Folkestone, but it flies much more freely at dusk, and at that time sometimes abounds, but it is a very local species, and must be looked upon in reality as the rarest member of the genus in Britain, although more widely distributed than some of them. Stainton gives as localities :—"Bristol, Lewes and Mickleham." I have also taken it sparingly near Kingsdown. Wocke gives a rather long list of localities, which, however, are chiefly situated in the Southern parts of Europe, our own Southern counties being about its northernmost limit. These are "Southern Germany, Switzerland, England, France, Italy, Andalusia, Greece, Sarepta, Bulgaria and Bithynia." ("Catalog.," p. 345).

Aciptilia migadactyla, Haw., (*spilodactyla*, Curt).—This species is very closely allied indeed to *galactodactyla*, but there is much more fuscous shading in this, and the species, therefore, has a very suffused appearance compared with *galactodactyla*.

SYNONYMY—*Migadactyla, Haw.*, 'Lep. Brit.,' p. 478; Tutt, 'Ent. Record,' I., p. 93. *Spilodactyla*, Curt., 'Brit. Ent.,' IV., 161; Stphs., 'Ill.,' IV., 371; Dup., XI., 314, 9; Zell., 'Linn. Ent. Zeit.,' VI., 391; H.-S. 25, V., p. 383. *Obsoletus*, Zell., 'Isis,' 1841, 859; Ev., 'Faun. Vol. Ural.,' 609. This species was named *obsoletus* by Zeller in the "Isis," but afterwards corrected by that author in the "Linnæa Entomologica." There is very little doubt that the correct name of this species is *migadactyla, Haw.* In 1890, I wrote with regard to the synonymy of this species :—"Wocke (as I have just pointed out) not only refers Haworth's *pallidactyla* to Hübner's *ochrodactyla*, but, more mysterious still, refers Haworth's *migadactyla*, a species with white wings and white body, to the same species. Now we have in Britain, I suppose, only three species with really white wings and white body—*pentadactyla*, *galactodactyla* and *spilodactyla*, two others are perhaps approximately white, but only so in the slightest degree—*tetradactyla* and *baliodactyla*. But Haworth describes three white species—*pentadactyla*, *galactodactyla* and *migadactyla*. He also describes *tetradactyla*, but not *baliodactyla*. This latter species is not white, and does not agree with Haworth's description :—'*Alucita* (the chalk-pit plume) alis fissis albidis fusco maculatis, anticis fissis posticis tripartitis, fuscis, *Fab.*' 'Habitat, Cretacis, ut valde infrequens.' 'Statura præcedentium. Corpus album. Alæ anticæ albidæ, fusco-maculatæ, posticæ fuscæ. Pedes albi, fusco maculati. *Fab.*' ('Lepidoptera Britannica,' p. 478). There is no British species but *spilodactyla*, to which this description could reasonably apply, and Haworth's remark :—'Perhaps the last two (*pallidactyla* and *migadactyla*) species would more naturally range immediately after *galactodactyla*' applies very strongly to *spilodactyla*. How Wocke could suppose that one of our white species might possibly be synonymous with Hübner's *ochrodactyla* I am perfectly at a loss to understand. The *migadactyla* of Haworth is prior to the *spilodactyla* of Curtis. I have left entirely out of account the Fabrician *migadactyla*, as there may be a white Continental (not British) species to which the description might apply, but that does not influence Haworth's use of the name for our species" ("Entomologist's Record," etc., Vol. I., p. 93).

Imago—The fore wings are divided into two plumules by a deep cleft, which reaches nearly to the centre of the wing, apex of both plumules acute, the second plumule falcate. The ground colour is white; the fore-wings are shaded with fuscous along the base of the costa. On the costa, directly above the fissure, is a distinct blackish streak, from which a fuscous shade runs directly to the extremity of the fissure ; a second fuscous shade runs obliquely from the extremity of the former one towards the anal angle, the two thus making an angulated fascia ; another but much fainter angulated fascia crosses the plumules between this and the apex of the wing; a third faint fuscous shade occurs near the apex of the upper plumule ; the median nervure and inner margin are narrowly fuscous ; the fringes white. Hind-wings divided into three plumules which are grey in colour, the outer part of the fringes white, the basal part grey. Stainton's diagnosis of this species is as follows :—"9‴—10‴. Fore-wings whitish, with a grey blotch at the base, and a grey blotch at the fissure ; fringes white, spotted with grey. VII." ("Manual," II., p. 444). I have already quoted Haworth's original description of *migadactyla*.

Curtis' original description of this species under the name of *spilodactyla* is as follows :—"White, inclining to straw colour. Antennæ subochraceous beneath. Eyes blackish. Head, thorax and abdomen sometimes rather straw colour. Wings, anterior with the costal margin and the base pale fuscous, a rhomboidal spot at middle of the costa, extending obliquely across the wing, interrupted by the nervure, fuscous; two spots near the apex upon the superior plume, and two or three upon the inferior one, of the same colour; inferior wings pale fuscous variegated with whitish; four anterior legs above, and thighs of posterior pair, fuscous. Beneath white, fuscous at the base of the wings, and spotted or variegated with the same colour towards their extremities" ("British Entomology," Vol. IV., p. 161).

Larva—The larva of this species is of a deep greenish colour, covered with short hairs. It has been found full-fed, at Freshwater in the Isle of Wight, by Mr. A. J. Hodges, from the end of May until July, a period of nearly two months. Like those of *galactodactyla*, the larvæ feed somewhat gregariously, a considerable number of specimens being found on one plant. Stainton says of the larva:—"On *Marrubium vulgare*. V—VI." ("Manual," II., p. 444).

The larva of this species is described by Mr. South as follows:—"Length six lines; attenuated posteriorly from the 5th segment. Head smaller than 2nd segment; green, with a yellowish tinge; crown slightly freckled with brown; cheek spots small, brown; mandibles brown. Ground colour green, sprinkled with minute black dots. Tubercles, two dorsal rows (four on each segment) whitish, each emitting a starlike tuft of white hairs; subdorsal, one wart on each segment, with a starlike tuft of white hairs; spiracular, one wart on each segment, emitting a starlike tuft of white hairs, and two or three longer whitish hairs. Prolegs and claspers, semitransparent with a green tinge, and tipped with brown. Food, white horehound (*Marrubium vulgare*); feeds on the terminal leaves; rests on the upper surface of a leaf in damp or dull weather, but hides under the leaves when the sun shines. June and July." ("Entomologist," XVI., p. 29). This is a very poor description of the larva, which is of a deep green colour, with distinct reddish or brownish oblique markings on the dorsal area, arranged so that those on either side meet in the centre of the dorsum, forming a distinct series of angular marks down the body, the points being turned towards the head.

Pupa—The larva pupates on the upper side of the leaf of its food plant (*Marrubium*), usually along the midrib. It is fastened by its anal segment, and has a considerable amount of free movement. It is of a dark green colour when the larva first changes to this state, but it gets whiter as the time for emergence approaches. Pupæ have been found by Mr. A. J. Hodges from the end of May until August, the species being spread over a very considerable period. The following notes were made directly after my first acquaintance with the pupa in a state of nature:—"The pupa is situated on the upper edge of a leaf lying directly along the midrib, and is exactly of the same dark green colour as the leaf. The longitudinal dorsal markings agree exactly with the elevated ridges of the leaves, and the hairy surface of the pupa corresponds exactly with the hirsute surface of the leaf. The pupa is attached only by the anal segment, which is placed nearest to the petiole of the leaf, the head being turned towards the apex of the leaf. This position, Mr. Rogers informs me, is the one always taken up by the larva when not feeding. The pupa, as mentioned before, is dark greenish in colour, with two rows of oblique longitudinal streaks along the dorsal area, those on opposite sides almost meeting towards the centre of the dorsum, the points being placed towards the head. The anal segment is bifurcate, and the pupa is attached by both forks or terminations. Just as the pupa assimilates in colour and markings to the leaves, so the imago assimilates to the half withered bunches of the flowers, the calyces and the flowering stems being that part of the plant apparently naturally frequented by the imago." Of the pupa Mr. South writes:—" Green, with whitish warts and hairs; wing-cases paler green, thickly studded with short whitish bristles along the edges. Fastened by the anal segment to upper surface of leaf of food plant. July" (" Entomologist," Vol. XVI., p. 29). It will be noticed that Mr. South leaves out the characteristic markings of the pupa.

TIME OF APPEARANCE—From pupæ sent me by Mr. Hodges, I have bred the moth in June, whilst it is on the wing continuously and without break until the middle of August. The following notes made at the time I first captured the species may prove interesting:—" On Thursday, July 25th, 1889, being located with the veteran H. Rogers of Freshwater, I persuaded him to accompany me to the locality for *spilodactyla.*

(*To be continued.*)

HOW DO ANIMALS BREATHE ?

BY A. J. JOLLEY.

How do animals breathe ? is a question which sounds sufficiently simple ; but like many other seemingly-simple questions, it is one of great complexity, and the more carefully we examine it the more manifest does this complexity become. Perhaps our safest answer (if asked the above question) would be to ask for a definition of terms, and we should possibly then be able to evade the issue.

The first term, "animals," is not by any means easy to define, that is if the definition is to be accurate ; whilst the second, "breathing," is still more difficult, and if our interrogator gave us a full and satisfactory definition of these terms he would have answered as satisfactorily as possible his own question.

It may perhaps be well if we take the second term first. Breathing or respiration are terms applied to functions of both animals and plants (though some regard its application in the latter case as erroneous), and these functions are the interchange of gases between the organism and the surrounding medium. In animals the most important of these gases are carbonic acid, which is given off, and oxygen, which is taken up ; the carbonic acid originating in the union of the absorbed oxygen with the carbon of the organic particles of the body ; the interchange of these gases is always effected through a moist membrane.

With regard to the first term of our question—"animals" : the best classification of living beings is that which divides them into three groups—protists, unicellular organisms ; and plants and animals, which are cell-aggregates. To the cell-aggregates the name Histiota is applied, but the attempt to give a brief and concise statement of the difference between the two divisions of the Histiota, plants and animals, has hitherto failed. The difference in the modes of nutrition is the nearest to being a sharp boundary line, most plants assimilating inorganic substances, whilst animals cannot derive nourishment from inorganic substances but require organic food.

Bearing in mind that animal respiration consists essentially in the inhalation of oxygen, and the exhalation of carbonic acid as a waste or bye-product of the organism, we may proceed to consider the various ways in which this exchange is effected in different groups of animals.

In many of the lower animals there are no special respiratory organs, the breathing being effected by the general surface of the body; but even amongst the protists we may conjecture a foreshadowing of the respiratory organs of the higher animals in the contractile vacuoles of many of the protozoa.

These vacuoles are empty spaces appearing irregularly in the protoplasm of which these animals consist, and it seems probable that they facilitate respiration.

The absence of respiratory organs is noticeable in the division to which the name zoophytes is given, and which includes the sponges and coral animals or " insects " as they are sometimes erroneously called.

In the next higher division, the worms, are included animals presenting considerable variations of structure, and, as may be imagined, of respiratory apparatus.

In many there is a water-vascular system which subserves respiration; this usually consists of two lateral trunks from which branches are given off. In the simplest forms there is one cross-branch in each segment of the body; in other words there is one tube along each side of the body and a connecting cross-tube for each segment of the body; the water enters this system of tubes by one or more external orifices; the whole presents a striking resemblance to the tracheal system of insects, which is really a higher development adapted for aerial instead of aquatic respiration.

In the earth worms there are neither gills nor water-vascular apparatus, but the dense though thin investment of the body is perforated by minute orifices through which the interchange of oxygen and carbonic acid takes place.

In many of the higher worms gills are developed which in some species are disposed regularly in tufts along the sides of the body, as for instance in the lug-worm (Arenicola piscatorium); in others, as Serpulæ, which secrete shelly coverings or tubes, the gill tufts are situated near the head, and with it can be withdrawn into the tube when the animal is alarmed.

The three next groups in the scale of animal life are molluscs, arthropods, and echinoderms; though, speaking broadly, all three are much more highly specialized than the worms, yet in all there are plain evidences of worm-like ancestry and relationships, either in the larval or adult state of some of the members of each of the three widely separated groups.

The way in which the transition from worm to mollusc was effected is indicated by the Brachiopods, creatures which have risen above the annelids and superficially resemble Lamellibranch molluscs, though they are only distantly and collaterally related to them: they are marine animals which have bivalve shells and a mantle similar to that possessed by many molluscs. In this group (Brachiopoda) the mantle is a breathing organ, though no true gills are developed. In true molluscs, distinct respiratory organs may be absent, though usually either gills or a pulmonary sac are developed; the latter being present in the land molluscs, of which the common snail is a familiar example. The pulmonary sac or lung is a development of the mantle.

Under the name of Arthropods are grouped by far the greatest number of the species of animals which exist or have existed on the earth. It is computed that four-fifths of the existing species of animals fall within the five classes which are collectively known as Arthropods, an Anglo-Greek word indicating the most striking characteristic of this group, the segmentation not merely of the body but of the limbs and appendages. It may be easily imagined that there are great differences in the breathing apparatus of animals so diverse as the centipede and the dragon-fly, the louse and the lobster, the beetle and the butterfly, the spider and the scorpion, all of which, and many more, despite their great differences, present such striking resemblances of structure as to cause systematic naturalists to group them together as forming one of the most important divisions of the animal kingdom.

The most common method of respiration in the Arthropods is by tracheæ: canals which open externally, usually by one orifice on each side of each segment of the body behind the head, and which ramify internally, carrying air to the blood which bathes the walls of these delicate air vessels; there are commonly two longitudinal canals running on either side of the body and connecting the larger tracheæ; the mouths of which are often protected by valves; this arrangement of the air vessels presents a striking and scarcely accidental resemblance to the system of water vessels in many of the worms; in fact the breathing apparatus of the highest insect, consisting as it does of two main lateral air trunks with innumerable ramifications from them, carrying oxygen into every part of the body, may be regarded as the last and highest form of the series which begins in the lowest worms.

Though many insects live in water, yet none possess gills, either in the larval or adult form. Water beetles, as probably all readers of this magazine are aware, take air down under their elytra, and when that is exhausted, come to the surface for a fresh supply; the so-called water scorpion (Nepa) possesses two long tubular processes which communicate with its tracheal system. By this apparatus it is enabled to procure fresh air without absolutely coming to the surface; it only needs to come so near to the top that the tips of its air processes project above the level of the water and permit the air to pass down into the tracheæ. This absence of gills is characteristic even of the aquatic larvæ of insects, which possess a complete tracheal system, but the mouths of the tracheæ (stigmata or spiracles, as they are variously called) are closed. Some of the segments of the body develop delicate processes, into which the branches of the tracheæ enter; these processes are often called tracheo-branchiæ, but the name is liable to mislead since they are in no sense branchiæ or gills. Gills are organs in which the blood is enabled to take up from the water some of the oxygen held in solution, whilst the delicate processes of the aquatic larvæ referred to, allow the passage of the oxygen into their own central tube, whence it is conveyed to the tracheæ, and so to the various parts of the body.

(*To be continued.*)

AIR-BREATHING ARTHROPODS.

BY LINNÆUS GREENING.

If we adopt the modern democratic principle of attaching great importance to numbers, the Arthropods are unquestionably the most important of the great groups into which animals are divided. Practically, however, no one carries out to their logical conclusions these democratic principles, but even after making due allowance for that pride of race which causes us to regard our noble selves as the apex of the animal kingdom, it still remains true that students of natural history, who are particularly strong in entomology, should take a special interest in studying the relationship of the different classes of Arthropods. These are usually regarded as six in number—viz., Onychophora, Myriapoda, Thysanura, Arachnida, Insecta, and Crustaceans.

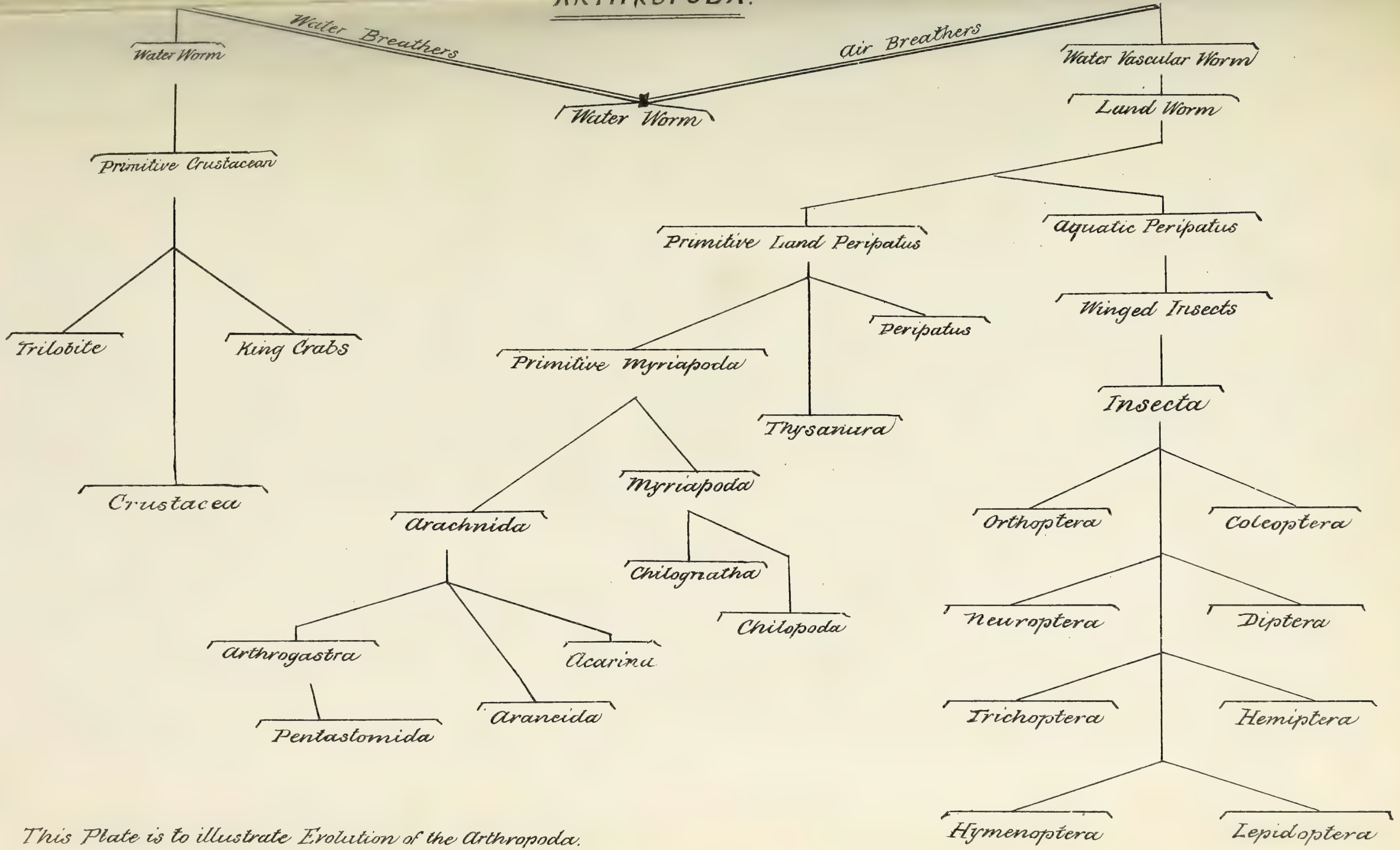
A much more fundamental, and presumably natural, division of the arthropod kingdom is into the two sub-kingdoms of gill-breathers and air-breathers, *i.e.*, Branchiata and Tracheata. The former is co-extensive with the class Crustacea, the latter includes the five other classes with which we are to deal in the following pages.

The majority of writers on the relationship of the Arthropods insist on comparing the members of the five air-breathing classes with the Crustaceans, and this tendency has certainly led to the enunciation as scientific truths of a considerable number of undemonstrable and probably erroneous statements.

If it be true that all the air-breathing Arthropods are much more closely related to one another than any of them are to any of the gill-breathers, the study of the comparative anatomy of air-breathers and crustaceans can have merely an academic interest, and can throw little, if any, light on the real affinities of these animals. It is in the highest degree probable that all the widely different members of the four higher classes of air-breathing Arthropods are the lineal descendants of terrestrial forms, superficially resembling our modern centipedes, and structurally intermediate between them and the Onychophora, which are the slightly modified descendants of the remote ancestors of all the Tracheata.

Before going further it will be well to define what is meant by an Arthropod. The literal meaning of the word is joint-foot, and the term happily expresses the tendency, so marked throughout the group, for segmentation to occur not only in the body but in all the appendages; even so delicate an organ as the antenna of a butterfly is as clearly a segmented structure as is the pincer of the scorpion. In many Arthropods, presumably in all, chitin enters into the composition of the exo-skeleton, which throughout the group is the hardest part of the body.

ARTHROPODA.



This Plate is to illustrate Evolution of the Arthropoda.

Linnaeus Greening - Warrington.

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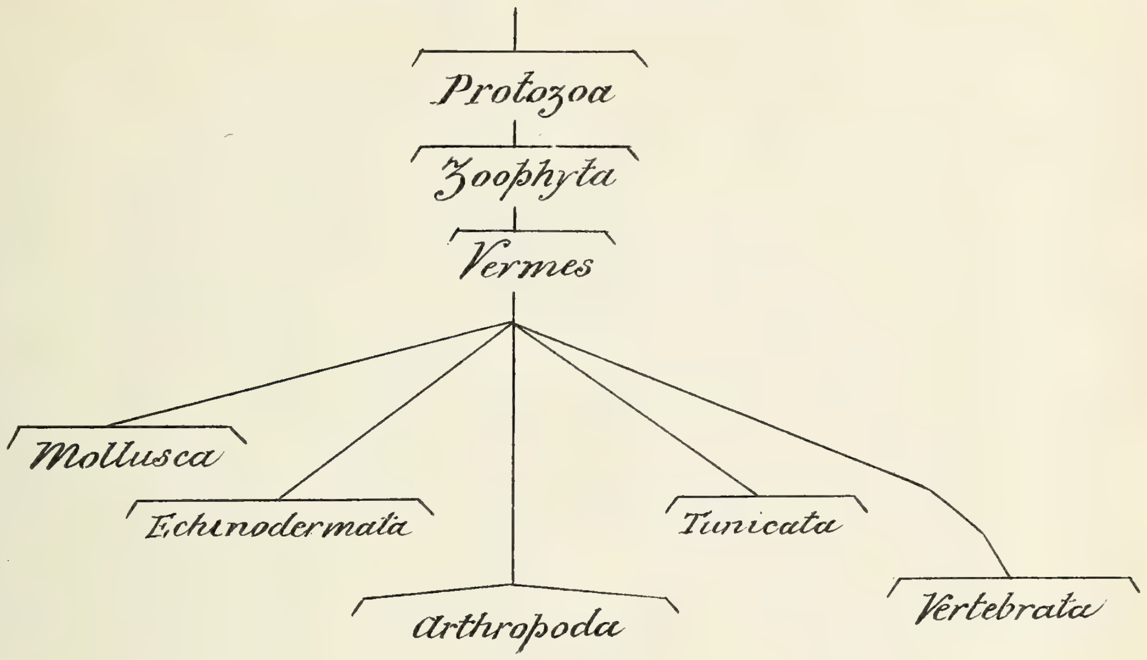
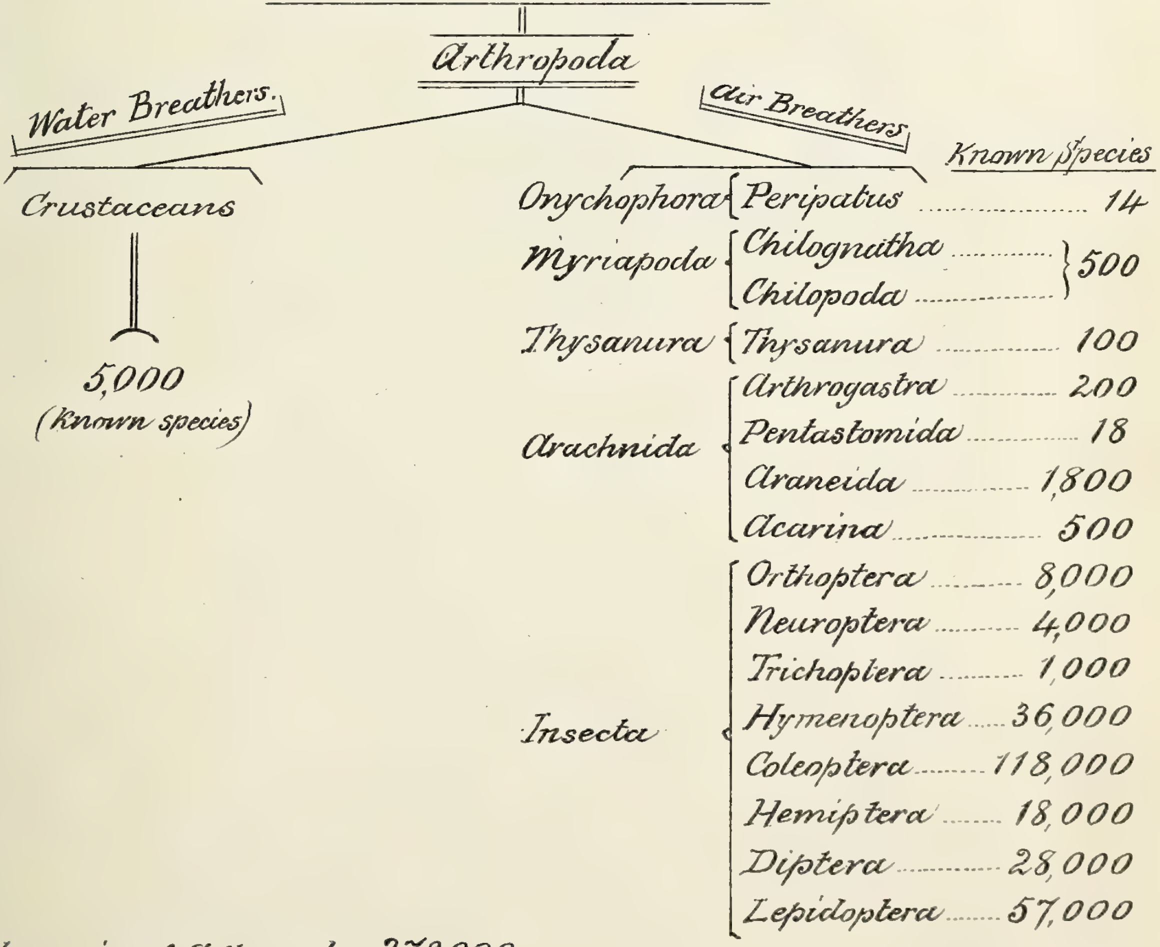
ANIMAL KINGDOM.



This Plate is to shew position of the Arthropoda in the Animal Kingdom.

ANIMAL KINGDOM



		Known Species
Onychophora	Peripatus	14
Myriapoda	Chilognatha Chilopoda	500
Thysanura	Thysanura	100
Arachnida	Arthrogastra	200
	Pentastomida	18
	Araneida	1,800
	Acarina	500
Insecta	Orthoptera	8,000
	Neuroptera	4,000
	Trichoptera	1,000
	Hymenoptera	36,000
	Coleoptera	118,000
	Hemiptera	18,000
	Diptera	28,000
	Lepidoptera	57,000

Total species of Arthropoda 278,000.

This Plate is to shew number of species in each order.

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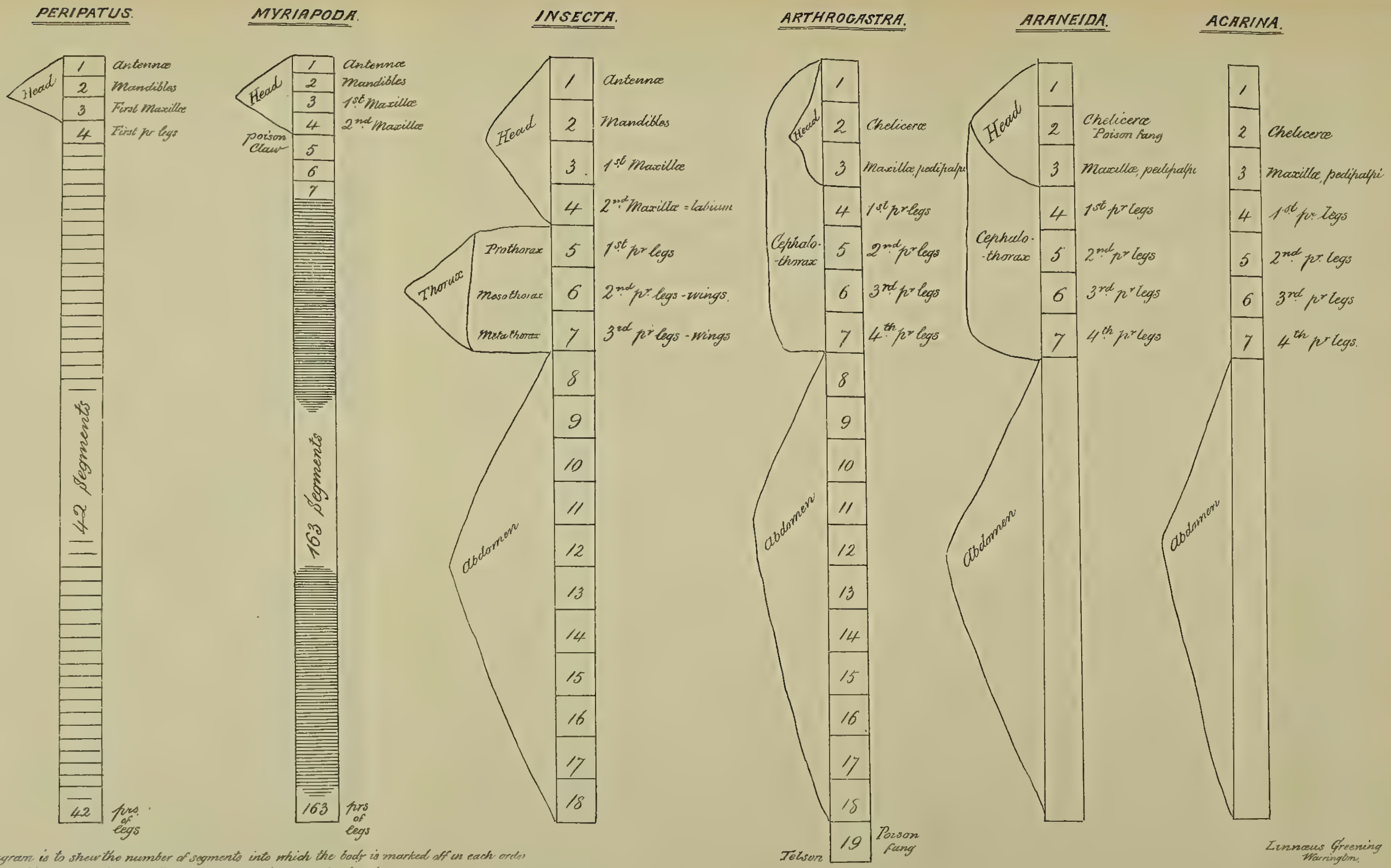

This diagram is to shew the number of segments into which the body is marked off in each order
Also to shew which segment carries the various external organs of each order

Linnæus Greening
Warrington.

[illegible]

In man and other vertebrates, the hard parts of the body and the levers (for that is what the bones of our legs and arms are), which move the body are internal to the muscles. The muscles are outside and cover the bones. In Arthropods the opposite obtains, the muscles being internal to the body and limbs. Having pointed out the two characters common to all Arthropods, it will be well if we now divide this great natural group into the two sub-kingdoms which have been previously referred to, viz., water-breathers and air-breathers. There is no doubt, in a sense, all Arthropods are air-breathers, for even those which breathe by gills extract the oxygen held in solution by the water; but though the function of respiration is of course common to both sub-kingdoms, the organs of respiration are fundamentally different.

There are a few terrestrial crustaceans, but even these retain their characteristic respiration. Their gills are, however, so placed as to lose their moisture very slowly, and thus, as these animals live in damp places, they are able to survive as terrestrial forms, although their breathing organs are adapted for aquatic life. It should be remembered that respiration can only be effected through a moist membrane; the crustacean gill is kept moist by the water; in the air-breathing Arthropods the tracheæ, which are minute tubes ramifying within the body, are kept moist by the blood.

Just as some of the essentially aquatic crustacean forms have become modified for terrestrial life, but still exhibit in their respiratory organs the indisputable marks of their ancestry; so amongst the air-breathing Arthropods, we find some adult and many larval forms which have become aquatic, but retain in their new element the breathing apparatus, of which structure is essentially that of their terrestrial relatives. In such forms the oxygen held in solution in the water passes through a more or less modified membrane into the tracheal system, and thereby reaches the interior of the body. Thus, in aquatic Tracheata, as in their terrestrial relatives, the air is conveyed into the interior of the body before it comes into contact with the blood which it purifies.

Having briefly noted the general characteristics of the Arthropods, and seen the fundamental difference between the two great sub-kingdoms, we may proceed to a more detailed discussion of the Tracheata which are divided into five classes. The animals comprising these five classes have nothing in common beyond the general arthropod characters previously described, and the more or less modified tracheal system.

There are many other features which are nearly, but none that are quite, characteristic. In classes comprising, as these do, the overwhelming majority of animal species, it will be evident and certain there will be some exceptions to any rule.

(*To be continued.*)

SULE SKERRY, ORKNEY ISLANDS.

BY GEORGE ELLISON.

A Paper read before the Warrington Field Club.

After repeated applications, the Commissioners of Northern Lights, in 1891, decided to erect a Lighthouse on the Sule Skerry, situated as it is right in the track of vessels passing our Northern coasts. This island and its neighbour, the Stack, have long been a source of terror and danger to mariners, many of whom have, no doubt, met a sailor's death in the surrounding depths, with nothing but the scream of the sea-gull and the angry roar of the Atlantic for their requiem.

A ring of stones, roughly laid together, with an entrance at one side, and about six feet high, testify to the wreck of some unknown vessel; and some years ago, the bones of two men were found here. Mr. Aitken, contractor, of Lerwick, Shetland, having been entrusted with the contract for the erection of a lighthouse of the first class, left Stromness in September of that year with the Inspector of Works, and with a staff of workmen, and arrived off the Skerry at night, but could not effect a landing owing to the heavy sea that was running at the time. Fortunately next morning the sea was quieter, and the party succeeded in getting on the Skerry; and after landing material and remaining there a day or two to build a hut capable of lodging eight men, and making a general survey previous to starting the work in the spring of 1892, Mr. Aitken and party returned to Stromness. Before proceeding further with an account of the Skerry, I must say a few words about the town of Stromness (more particularly as it is our starting point) and the Orkney Isles in general. It may be remarked that the number of summer and autumn visitors to the Orkney Islands has of late been rapidly increasing, and there seems little doubt that, in the future, this increase will continue. The islands possess many more attractions than tourists seem generally to be aware of. In England, many people labour under the impression that these Northern Isles are continually drenched in rain, or wrapt in mist, or swept by storm, and they would as soon think of taking a trip to Nova-Zembla as to the Orkneys during the holiday time; but I think one trial trip would serve to dissipate all such delusions. Time was, when the Churches in the Orkneys continued to put up the usual prayer for James II. three months after he had taken up his residence at St. Germain; but the benefits of the postal telegraph have now been extended to the islands, by way of Thurso, across the dreaded Pentland-Firth. It is only about three hours' journey from Stromness by the mail steamer, which runs every day; and the voyage between Leith and Stromness can be accomplished in 24 hours; or between Aberdeen and Stromness in 12 hours; but from Liverpool it takes close on two and a-half days, which includes calling and stopping for several hours at Oban and Stornoway. July and August are of course the best months for visiting the islands. At that period of the year, when pleasant weather generally prevails, the tourist cannot fail to be struck by the beauty of the isles as they repose on the blue waters of the Northern Sea. There is a fine variety in the forms they assume in the picturesque irregularity of outline and shore; some lie low on the waters, and some dash off the white sparkling foam from bold headlands; and while others surge up into hills of considerable altitude, there are quiet and secluded bays where the long waves break in silver spray on the sandy shore. Pleasant it is on the long summer nights to wander along these shores listening to the melancholy murmur of the sea, and the plaint of the gulls as they rise and sink above the waves. The air is strong and full of ozone, and one soon feels its invigorating effects, but the long and glorious evenings constitute the great charm of the Orkney summer. On the longest day the sun rises at two minutes past three and sets at twenty-three minutes past nine, and on to midnight there lingers a ruddy gleam along the horizon, and after midnight the light of morn mingles with the yet unfaded light of evening, the richness of which is often very beautiful.

The early history of the Orkneys, which comprises some 56 islands, holms, and islets, is of as stirring and romantic a character as that of any country owing allegiance to the British Crown; the bold and daring deeds of the Northern Sea-kings have been chronicled in the songs and sagas of many lands, the numerous acts of cruelty perpetrated by them, their piratical expeditions often ending in foreign conquest when neither age, nor sex, nor rank escaped their ravages, and when neither church nor monastery secured its inmates from destruction, illustrate the character, and give us a vivid notion of the ferocity of the early inhabitants. It is impossible definitely to fix the date at which Orkney was first discovered, but it is believed to be nearly 400 years B.C., and it seems probable that very soon thereafter a colony of Picts settled in some of the larger and more fertile of the islands. About the year 50 A.D. the Roman Emperor Claudius undertook an expedition to Britain, which he conquered as far north as the Orkney Islands, and the only opposition he met with was from a multitude of naked and undisciplined savages, whose only weapons consisted of clubs and stones, so that the whole country was speedily subdued. Of historical records regarding the early inhabitants there are almost none, but scattered up and down throughout the islands are abundant evidences, that in remote times they were peopled by a race similar in manner and habits to that which spread over the entire North of Scotland; this was the great family of the Picts, a strange race, and though so little is known of them historically, the monuments and remains testify to their having been a bold, hardy, and warlike race. Christianity is believed to have been introduced by the Culdees, the followers of Columba, but the dreadful irruptions of the Norsemen in the ninth century overwhelmed both the original inhabitants and their religion in utter ruin, and the Picts were swept away. About A.D. 863 Mythology ceases, and we are able to follow with greater accuracy the fortunes of the Kings of the Main. Norway, which was composed of numerous petty states with kings and governments acting independently of each other, now became united under the rule of Harold Harfragi, which caused great dissatisfaction amongst them, and, driven from their country by the cruel oppression of Harold, the outlawed Princes now swarmed into the Orkney Islands, and, writhing under injuries sustained, organised piratical excursions against the mother country.

(*To be continued.*)

REPORTS OF SOCIETIES.

LANCASHIRE AND CHESHIRE ENTOMOLOGICAL SOCIETY.

The annual meeting of the Lancashire and Cheshire Entomological Society was held on Monday, January 8th, in the class-room of the Free Public Library, William Brown Street, Liverpool, Mr. S. J. Capper, the president, in the chair. The following officers were appointed: President, Mr. S. J. Capper; vice-president, Dr. J. W. Ellis; secretary, Mr. F. N. Pierce; treasurer, Mr. C. E. Stott; and librarian, Mr. H. Lock. The President, in the course of a short address, thanked the members for the honour they had bestowed upon him in re-electing him as president. This was the seventeenth time he had acted in such a capacity. He congratulated the Society upon its continued success. They were now entering on their seventeenth year, and it was most gratifying to state that they had never been in a more prosperous condition than at present. The sudden death a few months ago of the Rev. H. H. Higgins deprived them of one of their most prominent members. They always welcomed his kind face among them at their gatherings, and listened with attention to his ever pertinent remarks. In the Rev. H. H. Higgins they had lost a member whom it was impossible to replace, and few men were such lovers of natural history as was their late friend. The retiring Vice-president, Mr. W. E. Sharp, delivered the annual address. The subject was "The New Entomology," and the writer, after briefly sketching the origin and historical development of Entomology, drew attention to the manner in which this study had been influenced by the modern methods of scientific inquiry, showed how great a revolution had been effected in the estimation of Nature by the general acceptance of the theory of Evolution, and how wider, fuller, and more important the study of the order Insecta had become since it had been treated as part of the great science of Biology, and appreciated the fact that Entomology meant something more than merely the collection and systematic arrangement of insects. In the course of the evening a number of exhibits were displayed.—F. N. PIERCE, Liverpool, Hon. Sec.

THE SOUTH LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY.

January 11th, 1894. J. Jenner Weir, Esq., F.L.S., President, in the chair.

Mr. Adkin exhibited several series of *Thera juniperata*, L., from various Scotch localities, contrasting them with those exhibited at the meeting previous from Purley.

Mr. Oldham showed a varied series of *Hybernia defoliaria*, L., and *H. aurantiaria*, Esp., from Epping Forest, and a specimen of the local *Libellula quadrimaculata*, L., from Cambridgeshire.

Mr. South, some remarkable varieties of *Cerastis vacinii*, L., taken in Kent and Surrey; with British and Continental specimens and varieties of *C. spadicea*, Hb., and a specimen of *Acronyeta aceris*, var. *infuscata*, Haw.

Mr. W. A. Pearce exhibited some very beautiful Rhopalocera from Alleghany, U.S.A., taken in 1893, viz., *Papilio asterias*, Fab.; *P. turnus*, L.; *P. philener*, L.; *P. troilus*, L.; *Limenitis dissippus*, Gat.; *L. ursula*, Fab.; and *Apatura elyton*, Bd.; Mr. Weir mentioned that the female of *P. turnus* was dimorphic, and that *L. dissippus* was the mimic of *Amosia plexippus*.

Mr. Auld, *Vanessa io*, which had been cleaned by Dr. Knagg with methylated ether, and which had regained its pristine appearance.

Mr. Tugwell sent for exhibition a long series of *Spilosoma lubricepeda*, Esp., and its various varieties and local races, especially of var. *radiata*, St., = *zatima*, Cr, and communicated notes, in which he described the York city form as var. *fasciata*. He had also sent for exhibition a pair of *Plusia moneta*, Fab., bred by Mr. Matthews; two varieties of *Artiavillica*, L., from Harwich; three dark Irish forms of *Agrotis lucernea*, L.; a long series of *Liparis monacha*, L., from New Forest ova, some of which were very dark; six of the dark Sheffield form of *Boarmia repomdata*, L.; vars. of *Lycæna segon*, Schiff, from Westmoreland; four *Dicranura bicuspis*, Bork., from Tilgate; a series of *Callimorpha hera*, L., bred from Starcross ova; a pair of *Pachetra leucophea*, View., taken by Mr. Hanbury on the North Downs; several *Noctua conflua*, from Shetland; six of the remarkable dark Irish form of *Campta bilineata*, L.; and a series of *Notodonta dromedarius*, L.—HY. L. TURNER, Hon. (Report) Sec.

NOTES.

MOLLUSCA.

Ianthina Rotundata, Leach.—I had always heard that the north coast of Ireland was a good locality for the "Blue Snail" or *Ianthina*, but hardly expected to have the good luck to get it on my first visit to that district. However, the prevalence of north winds during my stay (in August, 1893) was promising, as likely to drive these pelagic animals shorewards, and one morning the first *Ianthinas* put in an appearance at Port Ballintrae, county Antrim. Most conchologists are well acquainted with these lovely shells, but it is probably seldom that anyone has a chance of seeing the living creature with its curious float, which looks exactly like a mass of small soap bubbles. The frontispiece of Jeffrey's 4th vol. ("Brit. Conch.") gives a very good representation on the whole, though the colour of the animal should be more violet than red. For a few days they turned up regularly all along the Antrim coast (and probably elsewhere), being difficult to procure perfect on account of the rocky shores, but vanished with a change of wind. They vary a good deal in the height of the spire: one very fine specimen measures almost exactly 1⅕ inches each way, while another of about the same breadth has a length of only ⅘in. The copious purple dye which they exude thoroughly stains the hands, and is difficult to get out. A few dead shells of *Spirula* occurred at the same time, but this has never been found on our shores alive. The shells of *Ianthina* were frequently overgrown with a species of barnacle (*Lepas*).—Brockton Tomlin, Llandaff.

INSECTA.

Dictenidia Bimaculata.—This daddy cannot be called long-legs, like those of the genus Tipula. I was very fortunate last May (15th) in taking a female, apparently just out of the pupa, walking up the trunk of a lime tree. I captured a male several years previously, but the date and locality I did not record; the female, however, was taken close to Shaugh Bridge, Bickleigh side. This conspicuous fly appears to be very scarce. Mr. Verrall, in the E. M. M. for July, 1888, says:—"I can give as localities Worcester and Guestling." The male may be distinguished by the antennæ, which are pectinated only on the inner side, and are a trifle longer than the thorax; the third joint with a small projecting tooth on the under side; the joints from the fourth upwards with *two* comb-like projections (teeth of comb) on the inside of *each joint;* the one at the base is longer than the next on *the same joint*, and so on to the end. The antennæ of the female are but a trifle longer than the head, much compressed and disc-shaped ; her abdomen from the sixth segment is much prolonged and pointed, and as long as the first five. In colour the first three segments of the female are almost entirely ferruginous, the remainder black, the abdomen of male black.—G. C. Bignell, Stonehouse.

Early Plusia Larvæ.—The late very severe frost left us on the evening of January 9th, and on the afternoon of January 12th some of my grand-children, whilst playing in my garden, gathered several "Plusia" larvæ *very nearly full grown*, as they, the larvæ, were feeding during sunshine. From this I gather that 1894 should be attended to very early entomologically.—C. S. Gregson, Liverpool.

Abundance of Dasypotia Templi.—Collectors hereabout have this season—October and November—taken this species in unusual numbers, no less than 200 examples having been recorded to me. All, or nearly all, have been taken from gas lamps, and some in close proximity to the town.—J. W. Carter, Manningham, Bradford.

Books, &c., Received.

"*The Entomologist's Record and Journal of Variation*" (Elliot Stock, London).

EXCHANGE.

Exotic Scolytidæ.—Having acquired the celebrated collection of Bark Beetles, *Scolytides*, the largest in the world, of the monographer, Dr. Eichoff, I wish to obtain, by purchase or otherwise, all exotic *Scolytidæ* not classified, coming with original sendings.—Director Camillo, F. Schaufass, Miessen, Saxony.

Duplicates.—S. Ligustri, Populi, Tiliæ, Vinula, Citrago, Atalanta, Salicis, Augur, Brunnea, Perla, Edusa, Megæra, Bucephala, Cardui, Camelina, Persicariæ, Festiva, Pisi ; living pupæ of Populi, Tiliæ, Vinula, S. Ligustri, Ocellatus *Desiderata.*—Numerous.—C. B. Antram, 47, Upper Baker-street, Regent's Park, W.

Exchange.—Corneum, Anatina, Contecta, Leachii, Piscinalis, Nautileus, Cornea, Contortus, Hypnorum, Glutinosa, Stagnatis, Palustris, Fluviatilis, Putris, Elegans, Alliarius, Crystillinus, Cantiana, Caperata, Erictorum, Umbilicata, Lubrica, &c., &c. *Desiderata.*—Lepidoptera or Birds' eggs,—J. W. Boult, 17, Finsbury Grove, Fountain-road, Hull.

Duplicates.—Corynetes runpes, C. runcollis, Nitidula bipustulata. Habrocerus capmalicornis, Ocypus ater, Rhyncolus cylindrirostris, Aphodius fætens, A. nitidulus, Bembidium ephippium, Dermestes undulatus, Anthicus instabilis, Thyamis distinguenda, Lithochara brunnea, Amara convexiuscula, Hopatrum sabulosum, and nearly 500 others. *Desiderata.*—numerous.—A. Ford, Glen Mont, Braybrooke-road, Hastings.

Duplicates.—Filigramaria, Zonaria, Chi, Ulmata, Didymata, Glauca, Festucæ. *Desiderata.*—Numerous local series.—J. W. Baldwin, 472, Darwen-road, Dunscar, Nr. Bolton.

Duplicates.—Edusa, Corydon, Adonis, Tipuliformis, Hirtaria, Citraria, Rupicapraria (♀) Defoliaria (♀), Vulgata (bred, dark London forms), Assimilata, Bipunctaria, Pallens, Lithargyria.

Duplicates.—Lubricipeda var. (York forms), Sylvata, Immutata, Aurantiaria,* Boreata,* Albipunctata and var. Angelicata,* Valerianata,* Absinthiata,* Tenuiata,* Sparsata,* Gemina, Arcuosa, Suspecta, Cerago,* Silago,* Cucubali,* Viminalis,* Herbida,* Thalassina. *Desiderata.*—Numerous.—G. Jackson, Nunnery Lane, York.

Duplicates.—Edusa, C-Album var. Rothliebi, Rubi, Lucina, Comma, Actæon, Fuciformis,* Velleda, Globulariæ, Russula, Fuliginosa,* Prodromaria,* Trepidaria, Obscurata, Vernaria,* Strigilaria, Adustata, Subumbrata, Littoralis, Pudorina, Geminipuncta.—G. A. Booth, Grange-over-Sands.

Duplicates.—Rhopalocera, Neuroptera, Hymenoptera, Orthoptera, and a few Heterocera and Coleoptera, personally collected in Sierra Leone, to exchange for Foreign Lepidoptera and Coleoptera.—Dr. Clements, Frindsbury, Rochester.

Duplicates.—Fine Edusa, Blandina, Sibylla Vulezina, Cassipa, Ægon, Chrysidiformis,* Bembeciformis, Velleda (Shetland), Humuli (Shetland), Immanata (Shetland), Coryli,* Dipsaceus, Myriæ,* Trepidaria, Fumata, Carbonaria, Globulariæ, Capsincola,* Adusta,* Instabilis (light vars.), Gothica (vars.), Mendica, E. stevensata (few), Furcatellus cordigera, Cœsata. *Desiderata.*—Centonalis, Sericea, Aureola, Porata, Sinuata, Sagittata, Cassinea, Putrescens, Brevilinea ulvæ, Elymi, Concotor, Arundineti, Abjecta, Pyralina, Iychnitus, Semibrunnea, &c.—T. Maddison, South Bailey, Durham.

Reptilia.—Various Snakes and Lizards, British and Foreign. Shall be glad to correspond with students of above.—Linnæus Greening, Warrington.

Epeira Scolopetaria.—Specimens of this uncommon spider will be forwarded on receipt of tube and postage.—Linnæus Greening, Warrington.

What offers for Cooke's Freshwater Algæ (new), Internat. Series ?—A. J. Gillanders, High Legh, Nr. Knutsford.

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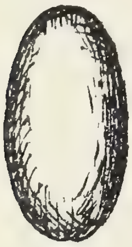

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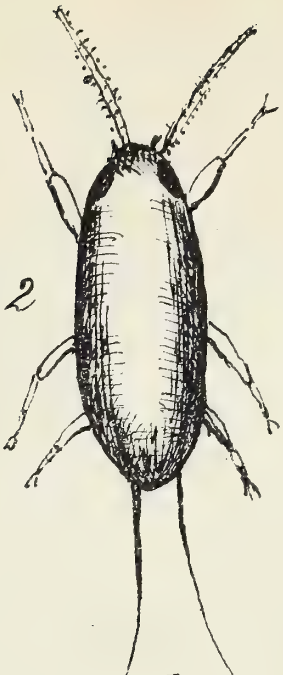

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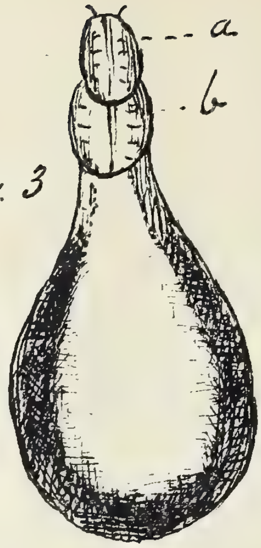

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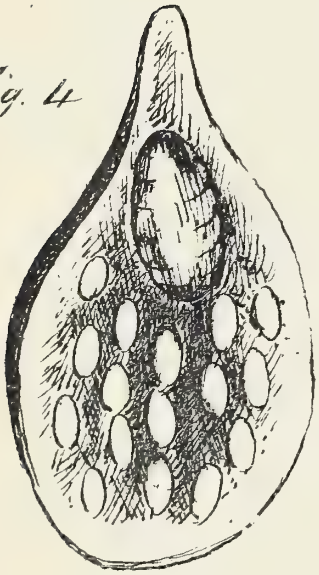

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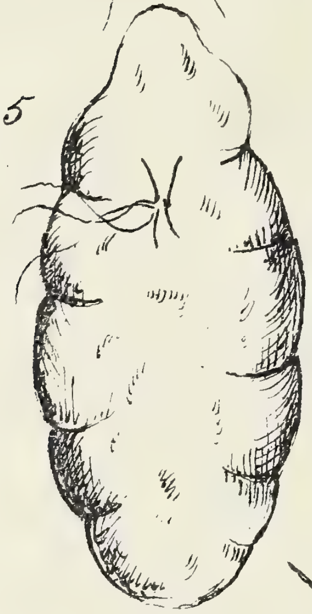

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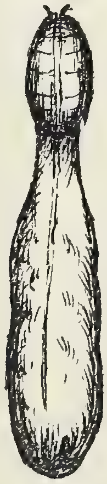

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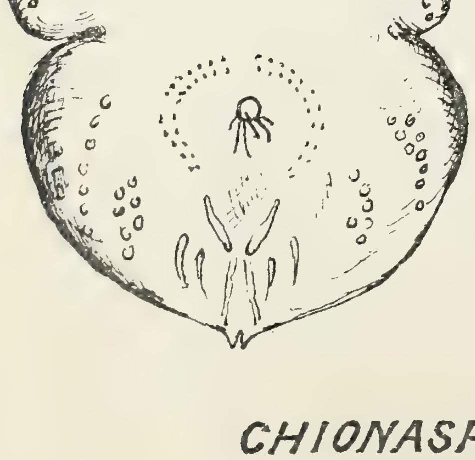

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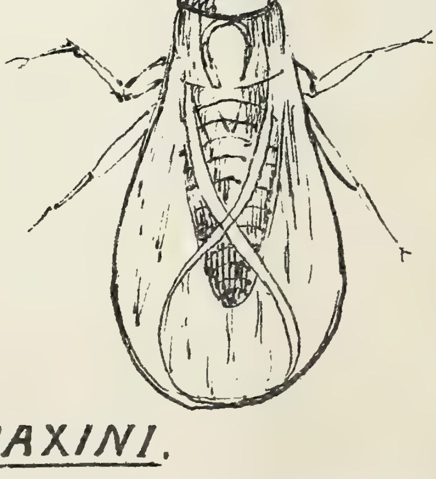

CHIONASPIS FRAXINI.

A. T. G. del. ad nat.

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CHIONASPIS FRAXINI. (THE ASH-BARK SCALE.)

BY A. T. GILLANDERS.

Amongst the many varieties of insects directly or indirectly injurious to our forest trees, none is more conspicuous, or more universally distributed, than the Ash-bark Scale (*Chionaspis fraxini*). It is generally found on trees varying from six to twenty years of age. Perhaps no insect pest appears more puzzling to the practical man than the "Scale" or Coccid.

The Coccidæ or Scale-insects belong to the order *Hemiptera*, which is divided into two sub-divisions, viz.:—(1) Hemiptera-Heteroptera, including the bugs; and (2) Hemiptera-Homoptera, including crickets, cuckoo-spits, plant lice (Aphides), leaf-hoppers (Psyllids), scale-insects (Coccidæ).

The investigation of the Coccidæ, or Scale-insects, is of comparatively modern date, and therefore very little bibliography is found to assist the inquiring student, that little being very difficult to procure. A very able text book, a Manual on general Entomology, published within the last decade, dismisses the group in a single paragraph. In the present state of our knowledge it is difficult to state who may have been the first to study Coccids on a systematic basis, but the celebrated French Entomologist, Signoret, was the first who published any elaborate monograph on the subject; viz., his *Études sur les Coccides*.*

Comstock, the American Entomologist, is another writer on the Coccidæ, and his monographs may be found in the United States Government reports, from 1880 to 1883. Maskell has written a very elaborate treatise on "The Scale Insects of New Zealand," copies of which are, however, very scarce in England. †

The Chionaspis belongs to the sub-family Diaspidinæ, which Maskell defines as "female insects constructing for themselves shields composed partly of secretion, partly of pellicles discarded from earlier stages, abdomen not cleft, legs lost at full growth."

The family of Chionaspinæ is one of the most destructive of the genus. However, it is not the typical form of Scale, but its life-history is interesting and may be easily followed. It is found in almost every locality on ash, alder, willow, and other plants.

A cursory examination shows that two forms of Scale attack ash trees,—the female form (Fig. 3) and the male form (Fig. 6). Sometimes we find both forms on the same tree, at other times only one form is found. In cases where the male form preponderates, a whitish appearance is presented.

If we lift a perfect female Scale at this season of the year (February), and examine it with a lens, or as an opaque object with an inch objective, a considerable number of beautiful red eggs will be noticed (Fig. 4). Now let us follow the development of these eggs (Fig. 1). In 1892 I kept some in confinement in the house, and found they hatched out the first week in May, but I did not find them on the ash trees in the woods until a week or ten days later. By the fourth week in May the bark of the ash trees, at a considerable distance, appeared to the naked eye quite red, caused by millions of the larvæ on the bark. These larvæ (Fig. 2) are very active, and would measure about the 100th of an inch in length. They possess six legs, comparatively long antennæ, two eyes, and two very long transparent hairs at the posterior end. The posterior legs spring from the abdominal part, which is a unique feature in insect anatomy.

There is no difference between the larval forms of the male and female. But let us first follow the metamorphosis of the female. These larval forms very soon lose their activity, and when they become quiescent begin to spin a covering or "scale" by means of a series of important but very minute organs known as "spinnerets," shown in Fig. 7. According to some observers they do *not* remain stationary and spin their scale directly behind them or around them, as a woolly aphis would do, but advance during the process of forming the scale.

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* This work is very difficult to procure. It first appeared in the Transactions of the Entomological Society of France from 1868 to 1876; and there is no authorized translation.

† We hear Mr. Morgan, Portugal, also writes on the subject. In England, we have Mr. Douglas, London, and Mr. Newstead, Chester; the latter has not only the finest collection of these insects, but is the chief authority on Coccids in this country, and it is to him I am indebted for his friendly advice as to their manipulation and classification.

After the larva has done sufficient "spinning," probably by midsummer (but I cannot speak with certainty as regards date), it moults, leaving its first moult (Fig. 3a) at the narrow end of the covering, and slips backward. More spinning is now done, but very soon it again casts its moult, and again slips backward underneath the cast-off skin and underneath the spun covering. This is the final "cast," and the metamorphosis is complete ; it is now a full-grown female insect. In the adult state the female spins more covering, but if we examine the insect microscopically we find that she is an inert, legless, slug-like object (Fig. 5). The sole object is now to lay her eggs, and suck the juices of the plant by means of the long rostrum which is inserted into the bark. The rostrum and setæ fulfil the twofold object of mouth and anchor. The female commences depositing her eggs in September, and dies soon after performing this function. At the time she commences depositing her eggs her body fills the ovisac, but as the eggs are deposited her body gradually shrivels until it remains as a small "portion" at the narrow end of the covering or sheath (Fig. 4).

Let us now make a microscopical examination of the female. A little practice will soon enable us to distinguish the shrivelled body of the female from the eggs. If we boil this body in caustic potash and mount in balsam in the usual manner, we shall observe the distinguishing characteristics which form the basis of classification. First let us note the well-developed rostrum, and then examine the anal segment, or pygidium. The number and arrangement of the spinnerets, the anal lobes, and hairs on the dorsal surface, and other characters requiring the highest powers of the microscope to display, are all taken into account by the specialist in this group. I have, however, refrained from entering into these details, which are only interesting to the specialist.

The male differs very materially from the female. We noticed no difference existed in the larval forms, but after spinning operations a difference is noticeable to the naked eye. The scale of the male (Fig. 6) is lighter in colour, shows the remains of only one larval moult, and is more lineal and carinated. Like the female, it slips from under the larval moult, but differs from the method followed by the female, inasmuch as it at once passes into the pupal form, and by the middle of July emerges a perfect two-winged insect (Fig. 8), having undergone its complete metamorphosis. Last season I bred out a very large number of males, several specimens of which I sent to Mr. Mosley, Huddersfield, who in reply said: "You could not have sent me anything I appreciate more, as I have been looking for male specimens for years." By observation I was also able to verify the statement of Mr. Newstead to the effect, that in the Chionaspinæ apterous as well as winged specimens may be found. It must be remembered that the males do not possess any kind of *mouth or feeding organs* whatever, and only live from three days to about a week, but they have during that short space of time attained the sole object of their existence, the perpetuation of their species. The *génitoires* are large in proportion to the size of the insect, varying from about one-third to half the length of the whole insect. We here see the adaptation to environment in the abnormal development of the gentalia requisite, considering that the female is stationary and helpless, and covered with a shell, while we note in her the absence of eyes and legs, both useless under an opaque shell. Here we have a beautiful illustration of the elaboration of one part and the degeneration of others.

SULE SKERRY, ORKNEY ISLANDS.

BY GEORGE ELLISON.

A Paper read before the Warrington Field Club.

(Continued from page 18.*)*

Harold, incensed at their audacity, resolved to subject the Orkneys also to his sway, which he speedily did; we are thus able to trace the present race of people, which, strictly speaking, is Scandinavian, who, I may remark, are a fine, strong, and kind-hearted people, their chief industry being the cultivation of the land and fishing, in which the strongest are engaged. It would really surprise you to see it so well cultivated, and to note numerous cattle grazing on its sweet but stunted verdure. You see no trees, with the exception of those planted in some gardens; but in the large tracts of moss the remains of trees are frequently found, and clearly show that at some early period woods have abounded there. Such is a rapid preliminary sketch of the Orkneys and the attractions which await the tourist.

Stromness derives its name from Strom (a stream) and Ness (a point or promontory), the Ness being seen in the tongue of land which runs out on the southern side of the bay, and the Strom in Hoy Sound which rushes past along its shore. In spite of its grey, antique look, it is comparatively a modern town. In the beginning of the last century it was a small fishing village, consisting of a few scattered huts, the town owing its rapid rise to its convenient position and fine harbour. At one time it became a place of regular call for vessels of all nations trading between the North of Europe and America. The Hudson's Bay Company's ships and a large number of North Sea whalers annually resorted to it for men and provisions. At one time, I believe, as many as a hundred vessels might have been seen riding in its capacious roadstead, but of course this is not so now. The herring fishery, abandoned in 1871, was resumed in 1890, which proved a good season, as also did 1891; but last year the herring fleet, which had increased from 50 to 250 boats, suffered very severely from the ravages of the dog-fish, whose numbers and voracity made the fishing a partial failure. A large number of steam trawlers from Hull and Grimsby call here on their way towards Faroe and Iceland for bait for the deep-sea fishing. Some of these steam trawlers are fitted with capacious wells, in which fish are carried alive for the London and other markets. The population is now about 1,600. Few towns have a finer natural situation; it is built along the margin of a beautiful little bay at the foot and on the lower slopes of a steep hill, commanding one of the finest views in Orkney. It consists mainly of one narrow and crooked street nearly a mile in length. Still the view which the stranger gets as he steams into the harbour is picturesque in the extreme, and the huge mountains of Hoy form a splendid background. An unique appearance is given to the town itself by the curious fashion in which many of the houses are built, their stepped gables turned towards the bay; and many of the houses have their own separate piers, from which it is easy to obtain fresh fish for breakfast. The harbour itself is a fine natural basin a mile in length and a quarter of a mile broad, and is completely land-locked. I may mention that not far from here is the old sandstone bed which furnishes more fossil fish than any other geological system in Great Britain, and here a portion of the "asterolepis" was found by Hugh Miller, and may be seen in the Stromness Museum. Though less than six inches long, it is part of a huge fish which has been found, varying from 8 feet to 23 feet in length. The portion is one of the central bones of the lower jaw of the monster.

But to resume. At the beginning of June, 1891, the contractor landed fresh material to enlarge the hut already built for the men, and for a separate hut for himself, also an additional one for the inspector of works, and then commenced the lighthouse in earnest. On the 8th of August, after getting on board the smack coals, sand, gravel, and a small donkey engine for working the cranes, by Mr. Atkin's kind permission, I, with the engineer sent to fix the donkey engine, the contractor and his wife, embarked for the Sule Skerry, which lies N.W. $\frac{3}{4}$ W., and is distant 40 miles from Stromness, and 35 miles N.E. from Cape Wrath. We heaved anchor at three o'clock in the afternoon, and with a light but fair breeze, soon got into the tide of Hoy Sound, which was slight, but of course in our favour; the tide here runs at the rate of about ten miles an hour, which is about half the tidal speed of the Mersey at Liverpool. Soon the wind falls light, and we begin to fear we shall not get out of Hoy Sound before the tide begins to turn, but with fresh puffs of wind, in an hour-and-a-half we are abreast of Hoy Head, a dark and lofty isle so eloquently described by Sir Walter Scott. I hear several gulls making a plaintive cry, the cause is not far to seek; a kittawake gull is being attacked by the common skua; this bird, when at rest, has a very hawk-like appearance, though allied to the gulls, and is as bold and insolent as most of the gulls are timid and retiring. It seizes the first opportunity of assailing a successful fisher, when it pounces on it and beats it with its wing until it rises from the water,—when the gull rises he soars up into the air to get away from the skua,—and when at a convenient height, Mr. Skua gets below him, and attacks him more vigorously than ever, until he compels the gull to disgorge his prey, and long before it reaches the water, it is caught and eaten; he then flies away to seek another victim; but often, the gulls combine together and attack the skua, and beat the marauder effectually off.

We now sight the "Old Man of Hoy," which is 450 feet high. It is evident that at one time it formed part of the cliff, as the various layers in the lofty column correspond with those on shore. Its isolation displays the power of the denuding agencies to which it has been subjected: at the beginning of this century it stood, so to speak, on two legs, an arch piercing through the lower portion of it, and there is no doubt, in the course of time, the remainder will succumb a victim to the ordinary atmospheric agents of waste, and to the pounding blows of the sea. We now begin to feel the tide against us, but fortunately, the wind freshens and we are able to stem it, and once well out of Hoy Sound the swell of the Atlantic begins to assert itself more fully, and I begin to feel the effects of Britannia not ruling the waves straight. We arrive off the Skerry at midnight, but we are only just able to make out the island, the night being dark, so we heave to, and wait until dawn. The contractor gets out the "murderer," and starts to fish for cod, coal-fish, or ling, which are abundant off here; in fact, I may say they almost jostle one another in their eagerness to be caught. But he has no such luck. Before the line has got down a few fathoms, a sharp tug announces the capture of a dog-fish, and in a very short time he caught sixteen of them. Just a word or two about this fish, which is called the "picked dog-fish," generally known in Orkney as the "Hoe." It is at once distinguished from all other species of the shark tribe by the spike placed in advance of each of the two dorsal fins, with which it can inflict a severe wound, very bad to heal. It measures from three to four feet in length, and is of a blue slate colour on the upper parts, and on the under of a yellowish white. It is ovo-viviparous, and produces many young at a time. It was owing to this fish that last year the Orkney herring fishing was a partial failure and in the Shetlands a total failure. I will just read you an extract from a Shetland paper, in which it says:—"For the last seven years the dog-fish have infested the coast of Shetland, and this year they have reached what may be hoped is the culminating point. They are by far more numerous than the stars, or the sand on the sea shore. From the rocks along the coast to the furthest ocean on every side and around the whole Shetland Isles, they are swarming in inconceivable numbers, and devouring everything. Little boys pelt them from the shore with stones, and if a bit of stick is thrown into the sea, they gather round it in a grey moving mass, bite at it, and try to swallow it. The bait on the fisherman's hook is swept off the moment it touches the water, and they utterly destroy the fishing nets, the loss in fishing gear having been very serious." The contractor soon gives up fishing, and we all turn in, with the exception of the night-watch; but we are pitching and rolling very heavily, so it takes me all my time to hold on to my berth. At four o'clock in the morning we make fast to the south moorings, which are about 400 yards from the Skerry, in 18 fathoms of water, and almost opposite to the south landing gully. We are not long in getting the small boat out, and with great difficulty, owing to the heavy swell, we make for the south gully. As it is low water, the rope ladder, 35 feet in length, does not reach the water; so when the boat heaves up with the swell, we have to make a spring at the ladder, which you may be sure is attended with a certain amount of danger, as a slip would mean a ducking in 20 feet of water. Well, we all mount an almost perpendicular rock without any mishap, and after scrambling a few feet further, I get a firm footing on the top, being the first tourist ever known to have landed there, and am met with the gaze of thousands of puffins, the scream of the tern, and numerous gulls. The Skerry is about three-quarters of a mile long and nearly 500 yards wide in its widest points, and 65 feet high at its highest point. A small portion at the north-east corner is cut off by a gully nine feet wide, which I believe runs dry at very low tides. The cliffs are mostly precipitous, formed of jagged rocks, with numerous gullies. The western side is the most rugged, and numerous reefs, lying below low-water mark, jut out a long way; but the east side is entirely free. The Skerry is granite of a fine quality, with a soil of a peaty character, which nowhere exceeds 18 inches in depth; it is covered with a long dark green grass on the west side, whilst on the east ox-eyed daisies bloom luxuriantly; the other plants I found were fennel, chickweed, sandwort, sea kale, and an atriplex, but none of the sea pinks, which occur so abundantly on the rocky coasts of Orkney. I also got several beetles, which Mr. Dutton has kindly mounted (one of which is a water-beetle), and there were numerous "daddy-longlegs."

At both the north and south gullies there are cranes, which are worked by a long wire hawser attached to the donkey-engine, and there are two fair-sized boats which are used to carry the material from the smack, and after use are hoisted up to the top of the gully. Either gully is used according to the direction of the wind and the force of the tide, which runs past the Skerry at the rate of six miles an hour. There is one thing I could never account for, and that was the very heavy swells which suddenly got up without any apparent cause. There were 18 men altogether, and they were housed in the hut nearest the lighthouse in one large room, the beds being one above another, like the berths on board ship. I myself had a bed made on the floor in the contractor's hut. I would just like to mention that the "forky tails," more commonly known to us as ear-wigs, were a great pest. I shall never forget my experience of them. I was forced to sleep in all my underclothes, and wrap myself well up in the blankets; yet they found their way through and bit me badly. The lighthouse is placed almost in the centre of the island, and at its highest point it will be 60 feet high to the lantern; to a height of 12 feet it is of concrete, 4 feet 9 inches thick, and then of a fire-brick, tapering at the top to 3 feet 9 inches thick. Three men will always be at the lighthouse and one ashore at Stromness, where they have built houses for them and their families. A new steam tender will also be stationed there, for the purpose of changing one man every week, so that each man will be three weeks on the Skerry and one week ashore. It is certain that in the winter months they will never be able to approach the Skerry, possibly for weeks together. One morning I counted nineteen great grey seals on a rock. They seem in no wise disturbed by strangers invading their domain; possibly they may have taken them for the Crofters' Commissioners, as the members of the "Phocidæ" have their little grievances as well as the crofter. In October they come to breed in great numbers, and I believe they climb on to the top into the few shallow, brackish pools of water. How they find their way up is a mystery to me, as it is practically impossible for anyone to find his way down to the water edge. One year upwards of 150 were clubbed by a party of men from Lock Eribol, mainly to procure oil from them for their lamps, the skin being almost worthless. Of course sea birds of every description were there, but I will only speak of those species whose eggs I obtained and have brought for inspection. We will therefore begin with the—

Great Black-backed Gull (*Larus marinus*), which is the largest species of the Gull tribe, and measures sometimes 30 inches in length and 5 feet 9 inches from tip to tip of wings. They are unsociable birds, even in the breeding season, and build their nests on the most inaccessible rocks. They are exceedingly wary, and soon give notice of the approach of any danger. One of these birds kept one of the men imprisoned for upwards of two hours behind a rock before he was discovered, he being unable to come out owing to it darting at his head.

Lesser Black-backed Gull (*Larus fuscus*).—The next in size, like its predecessor, resents any molestation, but is more sociable, and is to be found in spots frequented by the Herring Gull.

HERRING GULL (*Larus argentatus*).—Is generally seen following a vessel at sea, or attending the movements of a shoal of fish, and is frequently seen inland in newly-ploughed fields. It usually selects a flat ledge for its nest, in which as a rule it lays three eggs, which strongly resemble those of the Lesser Black-backed Gull, and can only be distinguished from that bird's by being somewhat larger, and by a more confluent character of the blotches.

KITTIWAKE GULL (*Rissa tridactyla*).—Takes its name from the cry with which, in the breeding season, it assails any intruder on its domain. Its plumage is beautiful; it is graceful in flight, and, like the Herring Gull, generally builds in the face of a precipitous cliff on a narrow ledge.

COMMON GUILLEMOT (*Lomvia troile*).—One of our common sea birds during a great portion of the year, though little known to seaside visitors owing to its habit of keeping well out to sea. They may be seen during a voyage—in flocks--diving, during which they use both wings and feet. In the breeding season they throng together from all parts of the open sea, and repair to some lofty cliff which they deem inaccessible, and lay a single egg, on the bare rock, which varies considerably both in ground colour and general markings ; and it is almost impossible to pick half a-dozen out of many scores that are precisely alike. I would here like to call your attention to a wonderful provision of nature. The egg is thick-shelled; one end is thick, and the other tapers almost to a point. Consequently, if moved by the parent bird when taking flight, it simply spins round and round within the length of its own axis.

BLACK GUILLEMOT (*Uria grylle*).—Is a smaller bird than the Common Guillemot. In summer it may be readily distinguished from other sea birds by its black and white plumage and red feet; but in winter, the predominant tint is white with a tinge of grey, and in higher latitudes the proportion of white increases.

PUFFIN (*Fratercula arctica*).—Known as the "Tamie Norrie." It builds on the Skerry in innumerable numbers. With their strong beaks they excavate holes about three feet in length, in which they lay a solitary egg ; they swim and dive with great skill, and have considerable powers of flight, but on land, their gait is only a shuffling attempt at progress. I noticed that when taking flight they always headed the wind, evidently to aid them in rising from the ground, and they seem so regardless of strangers that on more than one occasion I kicked them before they would show any sign of moving. They feed the young ones on sand eels, carrying as many as six or eight at a time ranged along the side of the bill, all the heads being within the mouth, and all the tails dangling outside. Unlike the other sea birds, their call is a deep groan, which you only occasionally hear coming from the nesting hole ; I think this is rather remarkable, considering the many thousands which build there. On August 12th they left the Skerry, and in a few days afterwards there was only a solitary one here and there to be seen; they migrate southwards, either to avoid the cold or to find waters where their prey swims nearer to the surface.

RAZOR BILL (*Alca torda*).—In general habits it closely resembles the Guillemot and Puffin, but is more frequently seen swimming than flying.

OYSTER-CATCHER (*Hœmatopus ostralegus*).—As a rule this bird frequents rocky places, where they feed on mussels and other bivalves, limpets, crustacea, and small fish. Mussel-Catcher, would be a more appropriate name than that by which it is known, for it neither has the power of diving in quest of oysters, nor of opening them if it could obtain them.

SHAG (*Phalacrocorax graculus*).—Except for being smaller and slightly different in plumage, there is little to distinguish them from the Cormorants; they are very shy birds, and are often to be seen on some ledge of rock, where they repair for the threefold purpose of resting, digesting their food, and drying their wings, an act which they perform by extending their bodies to their full height, and spreading their wings to their utmost extent. I will call your attention to the egg of this bird, which is almost entirely covered with a white, chalky incrustation, which, however, admits of easy removal by a knife, leaving the shell of a bluish green colour.

COMMON TERN (*Sterna fluviatilis*).—Generally known as the Sea Swallow; is less in size than any of the common species of Gulls, with which it is often confounded by the unobservant. It is more lively and active in its motions, and is often seen hovering like a hawk over some breakers, when, suddenly, it descends as if shot, to secure some small fry. One day on the Skerry I was going after some of the young birds, when I was pounced on by some fifty of these birds, and several times I was beaten with their wings as they flew by, uttering their harsh screams; I felt somewhat alarmed, but I have no doubt it was their mode of defence and to drive me away from their young; a couple of Herons wanting to alight were also summarily beaten off by these birds.

STORMY PETREL (*Procellaria pelagica*), generally known as "Mother Carey's Chicken," the smallest of webbed-footed birds, is as a rule invisible during calm or bright weather, when they hide themselves in holes, and behind stones, but when the sky clouds over, these ill-omened heralds of the tempest, inspiring more terror than would be caused even by the hurricane itself, leave their hiding places, not because a storm is impending, but because the cloud which accompanies the storm brings them the desired gloom. The single egg I obtained, I took from under the bird itself, and was the only one found on the Skerry. A few months back, I saw, in a bird-stuffer's shop in Liverpool, one of these birds stuffed for Lord Delamere, who shot it on "Petty-pool," Delamere Forest.

Eider Duck (*Somateria mollissima*), known in the North as "Dunter Duck," were to be often seen in flocks swimming about at the N. W. corner of the Skerry, in fact all the species of birds had their respective haunts in various parts of the island. Unlike all the other duck tribe, they frequent the sea, and occasionally the large freshwater lakes. The nests are usually composed of a foundation of sea weed or grass, and then lined with the beautiful light elastic down, known as the eider-down; this is plucked from the breast of the duck, and is used to cover the eggs as well as to line the nest. The down of commerce is obtained by robbing the nests, which is usually done twice; after a second robbing, the drake has to help his partner to line the nest, and as his down is said to be scarcely so valuable as the duck's, the third set of eggs are left in their warm shelter to continue their species. The eggs are a bluish green, and about the same size as those of the domestic duck. The newly hatched duckling, like their domestic cousins, take at once to the water; as, however, the nests are occasionally placed on inaccessible ledges, the old birds take the young on their back one at a time, and safely carry them down to the water.

The other birds seen by one of the men (who is a naturalist), and not known to have built there, are:—

1. Rock Pipit (Anthus obscurus).
2. Curlew Sandpiper (Tringa subarquata).
3. Turnstone (Strepsilas interpres).
4. Three Sand Martins (Cotile riparia).
5. Stonechat (Pratincola rubicola).
6. Grey Wagtail (Motacilla melanope).
7. Siskin (Chrysomitris spinus).
8. Redwing (Turdus iliacus).
9. Heron (*Ardea cinerea*) and Gannet (*Sula bassana*) or "Solon Goose."

The latter bird densely populates the Stack Island, which lies 4¾ miles away nearer to Cape Wrath. It is a bold rock standing out of the sea 130 feet high, and on a sunny day, at a distance, looks like a ship in full sail, owing to the droppings of these birds making it appear white.

The Skerry belonged to Mr. Heddle, of Melsetter, Hoy, who owns that island and the adjacent Island of Graemsay also; he claimed the Sule Skerry because he owned the nearest land across the shallowest sea; his claim was admitted, and the Skerry was purchased from him by the Commissioners of Northern Lights, in whom the ownership is now vested.

We left the Skerry at mid-day on August 13th, on the return journey; we had great difficulty in getting off the Skerry, owing to the usual heavy swell. Nothing of interest happened, except that I saw a few caaing whales jumping completely out of the water. Two years ago I saw ninety of these whales driving up on the shore in a bay close to Kirkwall, the largest being 27 feet long, and the smallest seven feet.

We arrived back at Stromness at midnight, having spent a most enjoyable time, which I shall ever remember. And, in conclusion, I would just like to mention that for three weeks the equinoctial gales were in full force previous to the 8th of September, and the smack went out twice from Stromness with cargo and fresh provisions, but on both occasions was unable to land, owing to the heavy sea. The weather moderating a little, a small steamer, with 300 tons of bricks, went out from Stromness with the contractor on board, and on approaching the Skerry, much to his surprise, he saw the cranes taken down and the huts tied down with chains and ropes. A boat put off with six men in, who coming on board, said that all the men demanded to be taken of. The contractor, seeing how things stood, went ashore, and said they must first unload the bricks, but the men stoutly refused, so, and making everything secure, they left the work until the following spring.

I trust that I have succeeded in giving you some general idea of this island, around which the giant rollers come sweeping majestically, and dash in snowy foam against the rocks with a deep thundering roar, and that you have realized some of the risks incurred in building the lighthouse, which will be, when completed, by far the most isolated in the British Isles.

GOSSIPING NOTES ON BRITISH COLEOPTERA.

BY G. A. LEWCOCK.

Since the publication of the last "Notes" under the above heading (vol. II. page 214), a new "Catalogue of British Coleoptera" has been issued by Messrs. L. Reeve and Co. (London), under the joint authorship of Dr. D. Sharp and Canon Fowler. Before proceeding with the "Notes," it will be as well to glance at the alterations in the new catalogue which affect the genera already dealt with.

The first on the list is the genus Cicindela. The only change of any importance to be observed here is the recognition of *C. maritima* as a distinct species instead of being considered as a variety only of *C. hybrida*, and to which our attention was formerly directed. ("Young Naturalist," vol. XI. page 5.)

The Carabidæ would appear at first sight to be arranged somewhat in the same order as in Canon Fowler's Catalogue of 1883. The grouping of genera, however, is slightly different, as, for instance, Notiophilus follows Calosoma; Elaphrus comes after Pelophila and Blethisa; Clivina precedes Dyschirius; Miscodera, Broscus, and Panagæus immediately following. From this point the arrangement is altogether different, and the views of the two authors are not in accord with their previous catalogues (Sharp, 1883; Fowler, 1883). As the Catalogue is chiefly intended for the use of British students, who, as a rule, have not the necessary time to study Continental authorities, one can only regret the absence of a preface giving reasons for the extensive alterations and changes in the nomenclature.

A further point in connection with the new Catalogue is with reference to the genus Bembidium. It will be found that the authors recognise *B. riparium* as of specific value, but one can hardly understand the confusing of two species under this term by these two authorities, more especially as M. Louis Bedel has so clearly defined their distinctive characteristics. The subject, it may be remarked, has previously been referred to in this magazine (vol. III. page 222), by Mr. E. A. Newbery; also by the same writer in the *Entomologist's Monthly Magazine*, with an editorial note by Canon Fowler; and in the *Entomologist* by the Rev. H. S. Gorham. There appears to be some divergence of opinion respecting *B. biguttatum*, *B. iricolor*, and *B. riparium*, and it becomes necessary to ask what is the species which we now recognise as *B. biguttatum*?

Our latest authority, Canon Fowler, in the "Coleoptera of the British Isles," describes *B. biguttatum* as having the seventh stria indicated by a series of punctures, but he makes no reference here to the joints of the antennæ. *B. riparium* he describes as having "the legs and base of antennæ reddish-brown instead of testaceous, and that the seventh stria of the elytra is altogether wanting." From this we infer that in *B. biguttatum* the base of the antennæ is testaceous. Fairmaire, 1854 ("Faune Ent. Française," page 158), describes *B. biguttatum* as having *six* striæ and *dark* bases to the antennæ. Dawson, also ("Geodephaga Britannica," page 179) at same date, though he omits to mention the number of striæ, virtually agrees with Fairmaire. M. Louis Bedel, the eminent author of "Coléoptères du bassin de la Seine," states that *B. biguttatum* has the first joint of the antennæ and the legs of a clearer red. The Rev. H. S. Gorham (*Entomologist*, vol. XXVI. page 350) says: "I shall myself prefer to use *riparium*, Ol., for the species with *pale bases* to the antennæ, as it has been so generally used by Schaum and others."*

It would appear from the foregoing that either Canon Fowler and M. Louis Bedel are wrong in describing *B. biguttatum* as having pale bases to the antennæ, or else an error has been committed by Fairmaire, Dawson, and the Rev. H. S. Gorham. In justice to the latter gentleman

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*I am unable to refer to the original description of *B. biguttatum* at present, as it involves an examination of some five or six works at the British Museum, but very shortly I hope to go deeper into this matter.—G. A. L.

I must make a further quotation from his article in the *Entomologist*, page 349. He says:—"I can quite corroborate Mr. Newbery's observation; and I fully agree with M. Bedel that there are three species, abundantly distinct, and easy to separate." He, however, disagrees with Mr. Newbery as to the use of the term *iricolor*, which, "it seems to me, is a mere synonym of *B. riparium*, as it has been recognised for the last thirty-seven years." The question still remains: "Which is the true *B. biguttatum?*" Until we get a satisfactory solution to this problem it will be useless to discuss any points bearing on the nomenclature. Suffice it to say, however, that the distinctions laid down by Mr. Newbery are so concise and clear that it would be decidedly best to adopt the table in its entirety as printed in the *British Naturalist*.

In our next issue the genera Callistus, Chlænius, Oodes, and Licinus will be dealt with.

THE GEOLOGY OF MILLER'S DALE.

BY D. S. STEUART.

(Continued from page 5.)

Such is the history of most of the limestone dales, as affects their origin and formation.

And now, having considered how the river cuts and carves out its course, grinding up and dissolving the solid limestone, taking full advantage of every fault or crack, and never for a moment halting in its work of destruction, let us turn for a moment to the action of the rain and the atmosphere, two of the most important factors in the process of denudation.

There are two ways in which this process is carried out, a chemical way and a mechanical way. Winds, gales and storms, as everybody knows, are very destructive; not only do they increase the pelting power of the rain, but sometimes blow down rocks. Even the gentlest kind of rain may in time do a great deal of damage to rocks and hills, moulding and grinding down their valleys in a variety of ways.

The other, and perhaps the most important, method by means of which the atmosphere and rain denude the hills and rocks is of a chemical nature.

Two of the constituents of the air, the carbonic acid and the oxygen, attack the various earths, rocks, and surfaces, altering their chemical composition, and converting the insoluble substances into soluble matters, and the hard smooth faces of the rocks into crumbling friable masses, ready to be swept away by running water or wind.

For an illustration of this action we must climb out of the ravine (not an easy task, owing to the steepness and slipperiness of the rocks), and, crossing the limestone ridge, proceed for a short distance at right angles to the river, when we arrive at what looks like a small quarry. On examining the face of the rock we shall find that the atmosphere has in a decidedly marked manner affected its surface, moulding it into masses of numerous round bosses, some smaller than an egg, others as large as a football. If we pick up one of these "spheroids," as geologists call them, many of which are lying at the foot of the rock, we shall find, on inspection, that it is composed of a loose friable material, becoming harder and more caked towards the centre, very different from the hard metallic looking basalt or toadstone! And yet not so different after all! For until those irresistible agents of denudation, the rain and the wind, commenced their disintegrating action on the rock, the two substances were practically identical, and were we to penetrate far enough, we should at length reach a portion of the rock analogous to the igneous basalt in the limestone.

Another important geological feature connected with the dale is the occurrence of mineral veins or lodes, a good example of which is to be met with down the right bank of the river, a short distance below Miller's Dale station. The veins are formed by a deposit of mineral in a crack or joint of the rock, which may have been enlarged by a stream of water containing carbonic acid in solution.

In this vein the limestone has been divided by a layer of toadstone cutting the lode at right angles, where it has become extremely narrow, owing to the smallness of the crack in the toadstone, on which the water has acted comparatively slowly. Crossing the river, the vein still continues to traverse the limestone cracks, where it has not been worked, and further on it practically terminates at a "fault": a place where a portion of the limestone bed has been broken off and forced into a different plane from that of the original bed. The fact is obvious enough from the similarity of the two surfaces, there being just a trace of the "rake-vein" in the newly located limestone corresponding to the lode in the old bed.

A "rake-vein" is a vein which traverses the strata vertically, or nearly so, and averages the same thickness throughout its length. Part of this "rake" has been worked for lead, and near the mouth is a large heap of excavated residue, which will well repay a cursory examination. Breaking up a piece with our hammer, we find it composed of a white semi-crystalline mass, dotted here and there with flat shining black crystals. They are what is known as *galena*, or sulphide of lead, and probably may contain traces of silver, the two metals generally going together; the white crystals are carbonate of calcium or calcite. Another piece shows white crystals of lead carbonate, and another of purplish colour is felspar, a compound of silica, alumina, and potash. There are many other interesting compounds to be found, and a great deal of knowledge and information may be gained by paying even a short visit to any of the dales in the limestone district, their geological formation closely resembling that of Miller's Dale; a little practical "grinding-up" of the rocks will go very much further than an equal amount of "grinding-up" text-books, and will exercise both mind and body alike.

REPORTS OF SOCIETIES.

ENTOMOLOGICAL SOCIETY OF LONDON.

January 17th, 1894.—The 61st Annual Meeting.—Mr. Frederic Merrifield, Vice-President, in the chair. An abstract of the Treasurer's accounts, showing a balance in the Society's favour, having been read by Mr. J. Jenner Weir, one of the Auditors, the Secretary, Mr. H. Goss, read the Report of the Council. It was then announced that the following gentlemen had been elected as Officers and Council for 1894:—President, Mr. Henry J. Elwes, F.L.S.; Treasurer, Mr. Robert McLachlan, F.R.S.; Secretaries, Mr. Herbert Goss, F.L.S., and the Rev. Canon Fowler, M.A., F.L.S.; Librarian, Mr. George C. Champion, F.Z.S.; and as other Members of the Council, Mr. Walter F. H. Blandford, M.A., F.Z.S., Mr. Charles J. Gahan, M.A., Mr. Frederic Merrifield, Prof. Edward B. Poulton, M.A., F.R.S., Colonel Charles Swinhoe, M.A., F.L.S., Mr. George H. Verrall, Mr. James J. Walker, R.N., F.L.S., and the Right Hon. Lord Walsingham, LL.D., F.R.S. Mr. Merrifield then read the President's Address, in which, after alluding to the principal events of the past year, and the prosperous condition of the Society, he referred to the additions which had been made in 1893 to the literature of Entomology, calling attention to the "Butterflies of China and Japan," by Mr. J. H. Leech; the "Moths of India," by Mr. G. F. Hampson; the "Butterflies of North America," by Mr. W. H. Edwards; "Lepidoptera Indica," by Dr. F. Moore; and the continuation of the "Biologia Centrali-Americana" by Messrs. F. D. Godman, F.R.S., and Osbert Salvin, F.R.S. He also commented on the recent publications of the Grand Duke Nicholas Mikhailovitch, Mons. Charles Oberthür, and Dr. Staudinger, on the Continent. The President concluded by referring to the losses by death during the year of several Fellows of the Society and other Entomologists, special mention being made of Prof. H. A. Hagen, M.D., the Rev. Leonard Blomefield, M.A., Mr. A. C. Horner, M.R.C.S., Prof. J. Wood-Mason, the Rev. Henry Burney, M.A., Mr. J. C. Bowring, F.L.S., the Rev. F. O. Morris, B.A., Mr. J. Batty, Mr. Francis P. Pascoe, F.L.S., Herr Eduard Honrath, and Dr. Adolph Speyer. A vote of thanks to the President was proposed by Colonel Swinhoe, seconded by Mr. Jenner Weir, and carried unanimously. Lord Walsingham proposed a vote of thanks to the Officers of the Society; this was seconded by Mr. Waterhouse, and carried unanimously. Mr. McLachlan and Mr. Goss replied, and the proceedings terminated.—H. Goss, Hon. Sec.

MANCHESTER CONCHOLOGICAL SOCIETY.

A RAPIDLY DISAPPEARING MOLLUSC.

The monthly meeting of the Manchester Conchological Society was held at Owens College, on Thursday evening, 1st inst., Mr. R. D. Darbishire, president, in the chair.

Mr. Hugh Fulton, of London, read an interesting paper on the genus Pleurotomaria, and exhibited a recent specimen of Pleurotomaria Beyrichii, from Enoshima, Japan. Much interest, zoologically and palæontologically, attaches to the ancient genus Pleurotomaria, a gasteropod which, previous to 1855, was only known in a fossil state. A large proportion of the older trochiform fossil shells have their whorls, whether round or angular, marked by a peculiar band, usually terminating in a deep slit at the aperture. Most of these were solid nacreous shells, and belong to the genus Pleurotomaria. In Woodward's *Manual of the Mollusca* the number of known species, ranging from the Silurian to the Chalk formation, was recorded (in 1854) as 400. Since that date the number of fossil forms described has been greatly increased. The palæontological gap which seemed to separate the fossil Pleurotomariæ from the fauna of to-day has been reduced, whilst the dredge of the zoologist and the nets of the fishermen have demonstrated with equal success that Pleurotomaria is living in the seas of the present date. The rarity of recent specimens, however, whether in public museums or private collections, is an incontestable fact. Four species, P. Rumphii, P. Adansoniana, P. Quoyana, and P. Beyrichii, are known, comprising in all only a dozen specimens, and of those neither the British Museum, nor the Museum of Jardin des Plantes, Paris, possesses an example. Little is known of the animal, most of the specimens being tenanted by hermit crabs when taken, but a specimen of P. Beyrichii, obtained by Dr. Gottsche, of Berlin, during his residence in Japan, from a fisherman of Enoshima, was actually caught with the mollusc in it, but the "intelligent" native very carefully removed it, and thus a most valuable prize was lost to science. The specimen exhibited by Mr. Fulton is a large and beautiful example, and was received from a fisherman at Enoshima. It is pale yellow in colour, streaked with bright orange red. There are now 1,160 species of Pleurotomaria known to science (including 226 British fossil species), which may be summarized in geological distribution as follows:—Living species, four; Tertiary, eleven; Secondary, 575; Palæozoic, 570. One is reluctantly compelled to admit that, although not extinct, Pleurotomaria is a genus of the past, and that, numerically speaking, its sun has set, both as regards individuals and distinct species, when compared with the grand extension the genus enjoyed in ages long past.

Mr. W. E. Hoyle exhibited an interesting collection of marine shells from Norway, dredged by Professor G. O. Sars, and presented to the Manchester Museum by Dr. Frithiof Nansen, the Arctic explorer. The collection, which includes some fine examples of northern forms of Astarte, Lyonsia, Aximus, and Yoldia, is now displayed to public view in the shell galleries of the Museum.

Mr. F. Taylor showed a series of Helix memoralis from Castleton, Derbyshire, showing variation in colouring of mouth, from the usual dense black, to pure white, which is the most uncommon form. Mr. Edward Collier exhibited a curiously repaired shell of Clausilia; Mr. Robert Standen showed an enormous specimen of the common whelk, nearly six inches in length, dredged off the Aberdeenshire coast; and Mr. W. Moss showed some fine examples of a planorbis-like Ampularia from Trinidad.

The following resolution was proposed by the President, seconded by Mr. W. E. Hoyle, and carried unanimously:—"That this society cannot meet without recording their deep regret for the loss of the late Professor A. Milnes Marshall, and of his encouragement, which he was always so ready to give to all Natural History studies."

MICROSCOPY.

Mounting Entomological Objects for the Microscope.—After soaking the insect in *liquor potassæ* until it is transparent, boil it in the same,—*cold liquor potassæ* will not dissolve oil,—then boil it in two lots clean distilled water, so that the alkali may be completely washed away. If necessary stain it with, say, aniline blue fluid. This is the only stain which will stain chitin well. Staining generally is a great improvement, for besides adding to the beauty of the insect, it brings up details otherwise unnoticed. Wash off the superfluous fluid in alcohol; from there transfer it to oil of cloves, in which it may be kept until it is wanted. To mount the object lay it on a slide arranging it neatly, and suck up with a pipette as much of the oil of cloves as possible, and place three small beads, or pieces of cover glass, around to support the glass cover. These must be slightly thinner than the object; put on the thin glass cover, securing it with a spring clip, now let the liquid balsam run under by capillary attraction. It is necessary that the cover should just touch the object which would otherwise be washed away by the wave ot balsam. Balsam and benzoline is the most suitable medium.

Muscles of Insects.—To retain the muscles of insects for microscope slides, soak the insects in ether, which dissolves fat, but has no other effect; mount as usual.

ARACHNIDA.

New Method of Mounting Spiders.—This method is very simple, and has the advantage over other methods in the spider being fully displayed, and able to be withdrawn from the jar if required for examination under the stage of the microscope. Take the spider from the killing bottle, and for a minute or so allow it to remain on a piece of clean blotting paper to absorb the superfluous moisture, then take an opal slip, smear the surface with a slight coating of *gum tragacanth* over the spot to be occupied by the specimen, place it, and arrange the legs in their natural position. After standing for about twenty minutes to dry the *tragacanth*, the slip can be placed into a jar of spirit, and the mounting is complete. Space may be left on the slip for additional specimens, which can be arranged in a similar manner if care be taken to dry the surface of the opal slip thoroughly before applying the gum. The gum, being colourless, is practically invisible,—a great advantage in the appearance of the mount,—while to remove a specimen it is only necessary to moisten the slip with warm water, and the specimen becomes detached. It is advantageous to mount a few specimens showing the underside, and the back of the slip may be reserved for duplicates; or, what is more convenient, two slips placed back to back may be used. The slips may be kept upright in the jar by a small strip of copper $\frac{1}{8}$in. wide, and as long as the width of the jar, bent in the middle———⌐¬——— to receive the upper edge of the glass clip. The advantage of this method is the rapid and easy execution, the time occupied being about two minutes, while the cost is small. A stoppered glass jar, six inches high by one-and-a-quarter inch diameter costs about ninepence, and an opal glass slip 5in. by 1in. by $\frac{1}{16}$in. costs three fathings, say tenpence in all, and in such a jar, both sides of the slip being utilized, twelve to sixteen specimens of a medium-sized spider, *e.g.*, *Zilla Atrica*, may be effectively displayed. The space occupied is small, a great desideratum in museums, as well as private collections.—G.

LEPIDOPTERA.

Pieris Daplidice and other Rhopalocera at Courtown, Co. Wexford.—Butterflies were very plentiful in the locality last season, but the number of species on the whole was rather small. *Colias edusa* was taken once, also *Cœnonympha davus*. *Vanessa atalanta* was very abundant, and in fine condition, and *V. io* not uncommon, these often occurring together; but we only saw two or three specimens of *V.* (*Cynthia*) *cardui.* The fritillaries *Argynnis paphia* and *Melitœa artemis* were not rare in the woods, and *Satyrus semele* and *Epinephile hyperanthus* Hb., near the sea. The prize of the collection, however, was a fine male *Pieris daplidice*, captured by Mr. Hind, on August 18th. It was probably a straggler from Great Britain or the Continent, as the species had never previously been taken in Ireland.—H. G. Cuthbert.

BOTANY.

Early Flowers.—A word may, perhaps, be allowed upon the subject of the present season—earlier, indeed, than 1893—and it will be curious to see what remains for us during the Spring. The winds, generally from the west, have been remarkably high and comparatively warm. It is officially stated from Liverpool that there have been more high winds during the past three weeks than during the whole of last year. In the neighbourhood of Warrington, not a particularly early locality, winter aconite, yellow crocuses, snowdrops, primroses, wall-flowers, sweet violets, and here and there a pyrus japonica bush, were in bloom by the last week in January, and daffodils are now ready to burst their buds. Gooseberry trees had quite a green appearance. Birds—thrushes, chaffinches, and hedge sparrows—were in song before February, and now the blackbirds are returning to their accustomed haunts in the shrub.

beries. Yellow jasmines (*jasminum nudiflorum*) and Christmas roses have decorated our gardens since the beginning of December. In fact, with the exception of a few days of frost, once or twice repeated, England has not known what winter is.—Robert Davies, Birchdale, Warrington.

NOTES.

Early Flowering of Hazel.—On page 5 of No. 1, *British Naturalist*, the 27th January is given as an early record for the flowering of this plant near Warrington. In that district, I have for the last ten years,—with one exception, when the flowers did not appear until the 5th of February,—found it in flower earlier than the date given. This year it was in full blossom, between Latchford and Grappenhall, on New Year's Day, and from the appearance of the catkins they had evidently been out a week.—C. R. B.

Curious Egg.—The other day, when breaking a hen egg which had been boiled for breakfast, I found a perfectly shelled egg measuring about three-quarters of an inch in length in the interior. I have preserved both the outer shell and the small inner one.—W. P.

Coal Tar Product.—Another product from Coal Tar has been discovered and named by chemists Tuluol. It contains no water, and can stand a much lower temperature than quicksilver without freezing; it is light, cheap, evaporating very slowly, and when warm expands with regularity, qualities which recommend it as a very suitable medium for filling the tubes of thermometers. Its lightness will enable the globe to be larger, and thereby secure greater regularity in registering the degrees of heat and frost, while its colour, which is dark blue, will make it more distinguishable in the tube of the thermometer and enable the registration to be easily and quickly read. Quicksilver freezes when the temperature sinks below 39 degrees centigrade, whilst alcohol, sometimes used for filling the tubes of thermometers, frequently contains water, which renders it an unreliable medium for purposes of barometrical registration.

We are pleased to announce that our old contemporary *Science Gossip* is to be revived under the editorship of Mr. John T. Carrington. We wish it under its new management every success, and our readers will undoubtedly welcome the new issue of an old and valuable magazine.

OBITUARY.

ARTHUR MILNES MARSHALL.

As the old year waned the scientific world was shocked by the sudden death of Arthur Milnes Marshall, the Beyer Professor of Zoology, in Owens College, Manchester, who was killed whilst enjoying a brief recess from his scientific pursuits in the mountains of the Lake District. An ardent mountain-climber, he was in the habit each year of spending a short holiday amongst the precipices of the Westmoreland mountains to stimulate himself for the more arduous climbing amongst the glaciers of Switzerland. On the last day of the old year, in the morning, with several companions, he left the Wastdale Hotel for a few hours' exercise amongst the precipices of Scawfell, and having overcome all difficulties, the party had reached the summit, and were looking for the most promising position to fix the camera for the purpose of photographing some of the most prominent geological features. Professor Marshall had mounted a few feet higher than the others, and had just called to his companions that the place where he stood offered greater advantage for the camera in the more extended view, when the noise caused by the fall of a stone attracted the attention of one of the party, who, on looking up, saw the apparently lifeless body of the Professor rolling down the side of the precipice. The cause of the accident, whether he had stepped on a stone which was insecure, or whether a stone loosened by the action of recent frosts had fallen from above and struck him, will never be thoroughly ascertained; the melancholy fact only remains that in an instant there was removed from our midst a most promising student of Natural History. That death was instantaneous is beyond doubt, for on examination it was noted there was scarcely a bone of the cranium which remained unfractured, and this fact lends some feasibility to the conjecture that the stone fell from above.

Arthur Milnes Marshall was born in Birmingham in 1852. His father was an engineer, and also enjoyed the reputation of being a Naturalist and Microscopist of no mean order. Prof. Marshall received his early education at a private school, and was entered at St. John's College, Cambridge, in 1871. There he studied Biology, and, obtaining a scholarship in Natural Science in St. Bartholomew's Hospital, he studied medicine, and shortly took his degrees as a doctor, a profession he was apt to regard with feelings anything but satisfactory. His election during the year 1879 to the Beyer chair of Zoology, then newly created, in Owens College, enabled him to devote himself to the study of his favourite science.

During the years 1877-81, he published in the *Journal of Anatomy and*

Physiology, and in the *Quarterly Journal of Microscopical Science*, a series of contributions dealing with cranial nerves, which were of value at the time, and formed the basis of other work in the same direction. The result of these investigations was the completion of his great work, "Vertebrate Embryology," which has only recently been published.

Amongst his many papers may be mentioned the report on the Pennatulida, the opportunity for the study of which was afforded through the dredging operations conducted by the Birmingham Natural History Society, off Oban, during the year 1881. The report appeared in the *Midland Naturalist* for the year 1882, Vol. v., under the joint authorship of himself and his father, and for which the Society awarded them the Darwin Medal. He also assisted in preparing the reports on the Pennatulida dredged during the Porcupine and Triton expeditions, and in these he very carefully worked out the distinguishing characteristics marking the various forms of zooids, &c.

The results of a short vacation spent in the Biological Laboratory at Naples are given in his paper on the "Nervous System of the Antedon," not to mention numerous papers read before the learned societies. He was President of the Manchester Microscopical Society, a position to which he had been elected successively for some years, and his addresses were replete with instruction and interesting facts. For his last address to the Society, delivered early in the month of February, 1893, he selected the subject "Death," in the Protozoa, Metozoa, &c., dealing very forcibly with the theories started by Weissman, Gotte, and Maupas.

His experience as a teacher, the success he attained in bringing home to the mind of the student, by simple means, the most difficult problems, the power of a clear exposition of complicated details, and his conciseness, signalled him out as a competent writer of text books for students, his work on the Frog and his "Practical Zoology" having passed through several editions.

His genial and urbane manner towards those who were brought into contact with him at once removed any feeling of diffidence, and his kindly disposition made him a cheerful companion; while the stimulating influence he brought to bear on those who worked under him, and the enthusiasm he infused into them, cause his loss to be the more regretted. He was in 1885 elected a Fellow of the Royal Society, and was promoted to the Council for the year 1891-2.—S.

DR. GEORGE GORDON.

At the advanced age of ninety-two, Scotland has lost one of its most enthusiastic supporters of Natural History, in the death of Dr. George Gordon, who, after labouring over three-quarters of a century in the cause of his science, died on the 12th December last.

BOOKS, &C., RECEIVED.

"*Irish Naturalist.*"
"*Sussex and Hants Naturalist.*"
"*Stray Notes on Noctuæ*" (TUTT).
"*Random Recollections of Woodland and Fen*" (SWAN SONNENSCHEIN).
"*Secondary Sexual Characters in Lepidoptera*" (TUTT).

TO CORRESPONDENTS.

Subscriptions, Exchanges, Correspondence, Notes, Papers for Publication, and all other communications must be addressed to the Editors "British Naturalist," Warrington.

All Exchanges, Queries, &c., for insertion in the following number, must reach us not later than the end of the previous month. All Queries must bear the writer's name.

Disguised Advertisements for the purpose of evading cost of advt., will not be inserted in the gratuitous exchange column. We request all Exchanges may be signed with name (or initials), and full address at the end.

Correspondents will please note and write on one side of the paper only.

ARACHNIDA.—*The Rev. Fredk. O. Pickard, Cambridge, will name and return any collections of British Spiders received from correspondents of the "British Naturalist," provided that several tubes be sent for their reception. He would also be glad to send types of British genera in return for any specimens he might wish to retain. The specimens* need not *be separated into tubes before sending, but a label, ready addressed and stamped, should always be enclosed. If the specimens are placed in separate numbered tubes, a paper, also numbered, should be sent for the reception of the names.*

ACARINA.—*Mr. C. F. Grove, Belle Vue House, Kirton-in-Lindsey, will name any specimens of Acarina sent to him for that purpose. Stamped envelope must accompany the application.*

DIPTERA.—*The author of "British Flies" (Diptera), Fred. V. Theobald, M.A., F.E.S., 12, Trumpington Street, Cambridge, will name specimens of Diptera sent to him for this purpose. He will also advise on the subject of injurious insects. Stamped envelope must be enclosed.*

EXCHANGE.

EXOTIC SCOLYTIDÆ.—Having acquired the celebrated collection of Bark Beetles, *Scolytides*, the largest in the world, of the monographer, Dr. Eichoff, I wish to obtain, by purchase or otherwise, all exotic *Scolytidæ* not classified, coming with original sendings.—DIRECTOR CAMILLO, F. SCHAUFASS, Miessen, Saxony.

DUPLICATES.—S. Ligustri, Populi, Tiliæ, Vinula, Citrago, Atalanta, Salicis, Augur, Brunnea, Perla, Edusa, Megæra, Bucephala, Cardui, Camelina, Persicariæ, Festiva, Pisi; living pupæ of Populi, Tiliæ, Vinula, S. Ligustri, Ocellatus *Desiderata.*—Numerous.—C. B. ANTRAM, 47, Upper Baker-street, Regent's Park, W.

EXCHANGE.—Corneum, Anatina, Contecta, Leachii, Piscinalis, Nautileus, Cornea, Contortus, Hypnorum, Glutinosa, Stagnatis, Palustris, Fluviatilis, Putris, Elegans, Alliarius, Crystillinus, Cantiana, Caperata, Erictorum, Umbilicata, Lubrica, &c., &c. *Desiderata.*—Lepidoptera or Birds' eggs,—J. W. BOULT, 17, Finsbury Grove, Fountain-road, Hull.

DUPLICATES.—Corynetes rufipes, C. ruficollis, Nitidula bipustulata. Habrocerus capillaricornis, Ocypus ater, Rhyncolus cylindrirostris, Aphodius fætens, A. nitidulus, Bembidium ephippium, Dermestes undulatus, Anthicus instabilis, Thyamis distinguenda, Lithochara brunnea, Amara convexiuscula, Hopatrum sabulosum, and nearly 500 others. *Desiderata.*—numerous.—A. FORD, Glen Mont, Braybrooke-road, Hastings.

DUPLICATES.—Filigramaria, Zonaria, Chi, Ulmata, Didymata, Glauca, Festucæ. *Desiderata.*—Numerous local series.—J. W. BALDWIN, 472, Darwen-road, Dunscar, Nr. Bolton.

DUPLICATES.—Edusa, Corydon, Adonis, Tipuliformis, Hirtaria, Citraria, Rupicapraria (♀). Defoliaria (♀), Vulgata (bred, dark London forms), Assimilata, Bipunctaria, Pallens, Lithargyria, testacea, furuncula, literosa, blanda, puta, suffusa, nigricans, N. rubi, c-nigrum, peria, capsincola (a few, bred), libatrix. Pupæ of alchemillata. Desiderata—very numerous; especially obfuscata, simulata, trepidaria, tristata, albicillata, fumata, salicata.—LOUIS B. PROUT, 12, Greenwood Road, Dalston, N.E.

Duplicates.—Lubricipeda var. (York forms), Sylvata, Immutata, Aurantiaria,* Boreata,* Albipunctata and var. Angelicata,* Valerianata,* Absinthiata,* Tenuiata,* Sparsata,* Gemina, Arcuosa, Suspecta, Cerago,* Silago,* Cucubali,* Viminalis,* Herbida,* Thalassina. *Desiderata.*—Numerous.—G. Jackson, Nunnery Lane, York.

Duplicates.—Edusa, C-Album var. Rothliebi, Rubi, Lucina, Comma, Actæon, Fuciformis,* Velleda, Globulariæ, Russula, Fuliginosa,* Prodromaria,* Trepidaria, Obscurata, Vernaria,* Strigilaria, Adustata, Subumbrata, Littoralis, Pudorina, Geminipuncta.—G. A. Booth, Grange-over-Sands.

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Some Curious Aquatic Larvæ. GEO. SWAINSON, F.L.S.

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An Entomological Trip to the Canary Islands. MOREL-DEVILLE.

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GOSSIPING NOTES ON BRITISH COLEOPTERA.

BY G. A. LEWCOCK.

(Continued from page 36.)

CALLISTUS, Bonelli.—This term is derived from the Greek (καλλιστος), and is interpreted "most beautiful." Our single species, *lunatus*, F., is taken principally in Kent and Surrey. I have never been so fortunate as to capture it, but Mr. Beaumont took it at Betchworth, while on an entomological excursion with Mr. West. It is recorded in "Kent and Surrey Coleoptera," by Mr. Champion, as local and not uncommon on chalky hillsides at roots of grass, on pathways, &c. Folkestone, Canterbury, Dover (Kent); Caterham, Reigate, Riddlesdown, and Mickleham (Surrey).

CHLÆNIUS, Bonelli.—A Greek word (χλαινα), meaning "a cloak." The specific term *vestitus* also contains the same idea. Although some thirty or forty species are enumerated in the Continental list, we can claim but four as truly British insects. None of the species can be termed common, but at times several specimens of *C. vestitus* and *C. nigricornis* may be found in a single visit to their respective localities.

C. VESTITUS, Payk., may be readily distinguished by the yellow border of the elytra. The insect occurred at Wormwood Scrubs a few years since, under stones in a ditch, but, although I obtained nearly a dozen, they were found mostly in pairs and single specimens. Mr. Champion, however ("Kent and Surrey Coleoptera"), finds it in "marshy places, common everywhere." Other localities are Lee and Lewisham, on clay soil, round ponds (West); Putney, Wimbledon, Woolston (Hants), on banks of rivers and streams, running in sun on reed refuse (Newbery). Not recorded from Liverpool district or Ireland.

C. schrankii, Duft.—This species and *C. nigricornis* are rather similar in appearance, both being of greenish or reddish bronze, with a thick pubescence on elytra, and each has the prosternal process punctured between the coxæ. *C. shrankii* has the three basal joints of the antennæ red; while *C. nigricornis* has one only of a lighter colour. The present species (*schrankii*) is considered rare, but has been taken in some numbers at Luccombe Chine, Isle of Wight. Mr. West possesses a series "taken at the old locality by Mr. Gill." I have no other records.

C. nigricornis, F.—Has been turned up recently at Hendon in moderate numbers by Messrs. Newbery, Heasler, Burrows, and others. Four specimens fell to my lot at Wormwood Scrubs, and also on the banks of a small stream near Esher. Mr. Newbery also records it from Putney and Wimbledon, running in the sunshine on reed refuse. Mr. West takes it sparingly at Lewisham and Lee district, also at Loughton. Mr. Champion ("Kent and Surrey Coleoptera") records it as "common and generally distributed in marshy places." It "is not uncommon in Lancashire, particularly around Manchester" (W. E. Sharp). The late Mr. R. Gillo found it very abundant in damp places at Wick Rock (Bath district). Ireland: The Rev. W. F. Johnson records it in Armagh district, under stones on edge of lake, Lowry's Lough, not plentiful.

There is a variety of this species, *melanocornis*, Dejean, which has red legs instead of pitchy, but I have never seen a specimen, neither do my correspondents report its capture.

C. holosericeus, F., is mainly distinguished from the preceding two species in having the prosternal process not punctured between the coxæ. The beetle is generally considered very rare, and I have no authentic record of its capture.

Oodes, Bonelli.—The Greek word (ὠοέιδὲς) means egg-shaped, and refers to the appearance of the insect. Only three species occur in Europe, and but one of these in Britain. *O. helopioides*, F., as its name denotes, is of different formation to the genus Chlænius, and cannot be confounded with any other species. The beetles were turned up in some numbers by Mr. Billups, at Rainham (Essex), and in same locality by Mr. Ryder, who gave Mr. West a series. I have not been fortunate in securing any myself, but last year Mr. Heasler found several specimens among reed refuse at Hanwell (Middlesex). It is also recently recorded by Mr. T. Edmunds, jun., from banks of Dart, Totnes; and formerly taken in a marsh at Sheire, by Dr. Capron; at Dorchester, by Mr. C. W. Dale. Mr. F. W. Lambert, of Oxford, writes: "I take

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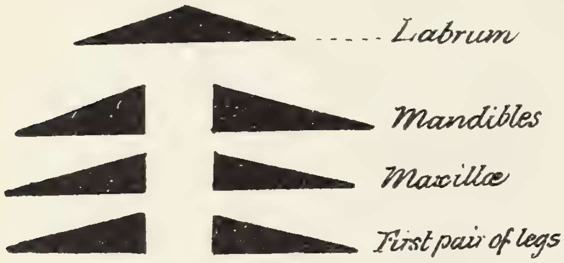
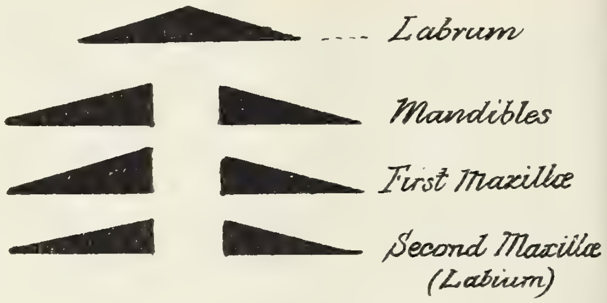
PLATE 2.

DIAGRAMMATIC SECTIONS OF MOUTH ORGANS.

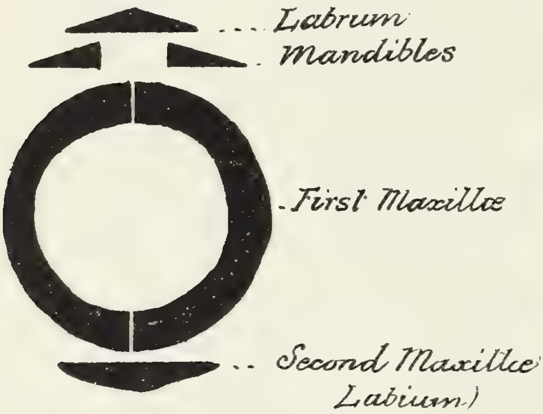
PERIPATUS



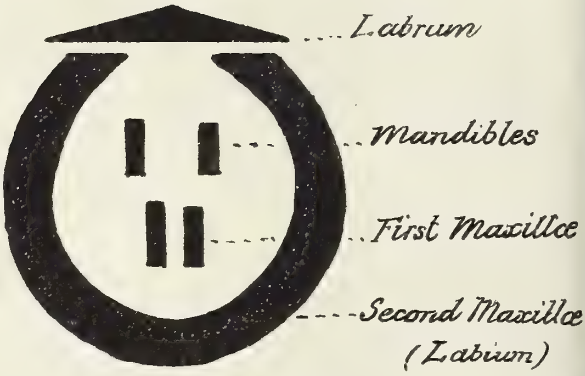
ORTHOPTERA



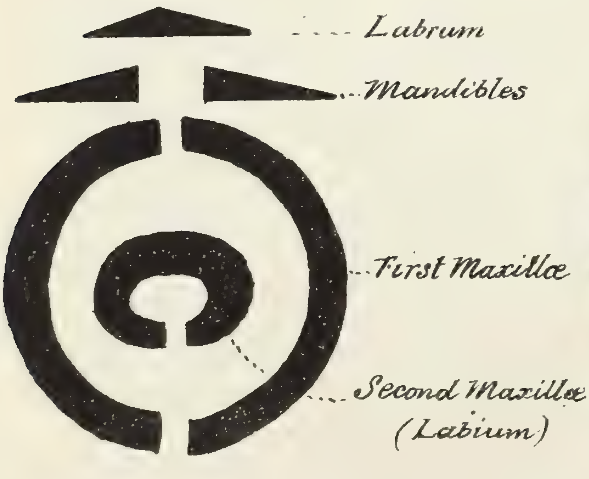
LEPIDOPTERA



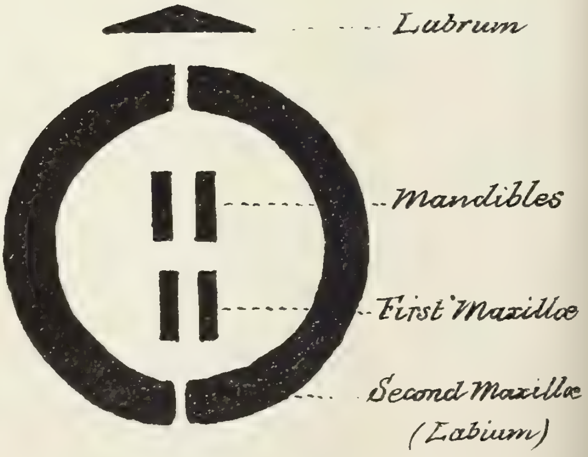
HEMIPTERA



HYMENOPTERA



DIPTERA



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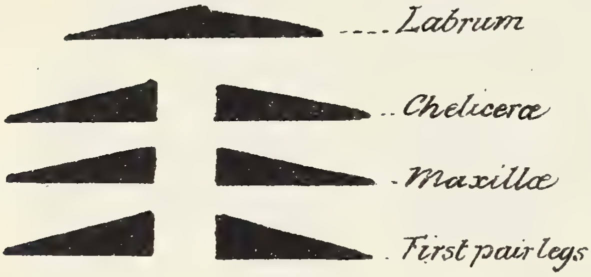
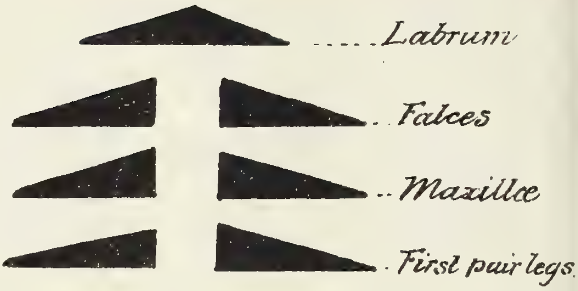
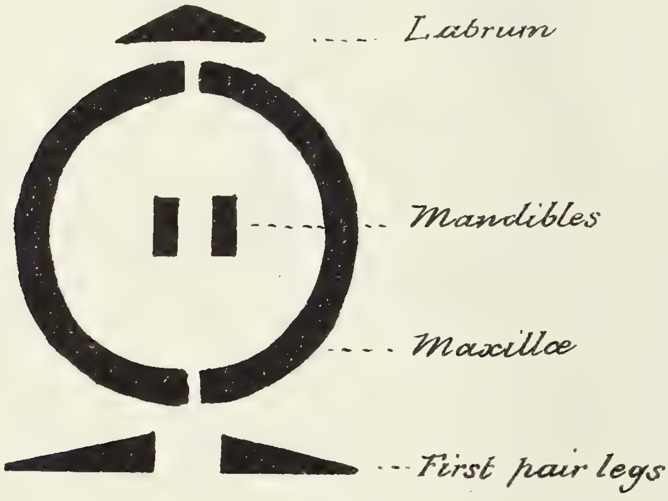
ARTHROGASTRA



ARANEIDA



ACARINA



EXPLANATION OF PLATES.

Each drawing represents a section cut across the face of the various insects and arachnids - shewing sections of mouth organs in situ, and how various mouth parts are modified in each order.

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Linnaeus Greening.

O. helopioides very sparingly. Perhaps I should take more if I knew the most likely spots to search. As a rule I find it at roots of trees near the water, or hibernating in rotten stumps." Several localities are given in Fowler's "Coleoptera of British Isles." Ireland: The Rev. W. F. Johnson writes that *Oodes helopioides* "has no record from Ireland; there is a specimen in the collection of the Belfast Museum, but, as it is without label, it is probably not a native."

AIR-BREATHING ARTHROPODS.

BY LINNÆUS GREENING, F.L.S.

(Continued from page 15.*)*

For instance, the majority of them possess a pair of sense organs on the head, the antennæ, but these are wanting in the Arachnida; again, most insects are winged, but it is of course well-known to every entomologist that there are exceptions to this rule.

There is little room to doubt that all the Arthropoda have developed from worm-like ancestors; and in very early times these branched off into two main lines, the Crustaceans on the one hand, and the Tracheata on the other. The tracheal system is unquestionably a modification of that water-vascular system present in many worms; and although the worm-like ancestors of our air-breathing Arthropods were, in the far-off past, aquatic, there is no doubt that the earliest true tracheal system occurred in one of their terrestrial descendants, which in some other respects resembled our modern Peripatus. The but slightly modified descendants of this earliest tracheate form constitute the lowest of the five classes of our air-breathing Arthropods. This class, Onychophora, embraces but genus Peripatus, which has about 14 species; all are small animals and may not unreasonably be described as annelid worms, plus a pair of antennæ, a pair of segmented legs on each body ring, and a tracheal system of breathing. Like most archaic forms they are widely distributed but relatively few in number, and they are the lonely representatives of a race which was once the summit of the animal kingdom! Following closely upon the heels of this primitive Peripatus came the earliest representative of the second class, the Myriapoda. These animals are Peripatus, plus a harder and stronger exo-skeleton, a body and limbs presenting more definite segmentation and showing traces of the tendency, so much more pronounced in the higher classes, of some of the somites, to coalesce. This tendency is especially marked in the Chilognatha, the majority of whose body segments bear two pairs of legs, clearly indicating that each segment represents two coalesced somites, or body rings of the ancestral form.

This tendency to coalesce, which is also shown in the anterior somites of the Myriapods, is more pronounced in the three higher classes; the head of the fly, as well as the head of the spider which kills it, undoubtedly represents a number of coalesced somites, the abdominal and thoracic regions of most Arachnidans and insects present similar features. The tendency to develop spinning glands, results of which are evident in the beauty of the spider's web, in the cocoon of the silk-worm, and in the less perfect cocoons of other insect larvæ, is present in the Myriapods, many of which spin webs.

Again in this central type we find a foreshadowing of the poison gland and fangs which in the spiders become such formidable weapons.

Existing Myriapods show clearly how the mouth organs of insects and Arachnidans have been developed from walking legs. Curious though it may appear, it is nevertheless true, that the jaws of insects are modified legs; organs originally of locomotion, they have become modified for biting or sucking. The early stages of this process are indicated in Peripatus, whose second somite bears a pair of mandibles the structure of which is simple, and places beyond doubt the fact that they are walking legs modified for biting. The third somite also bears a pair of modified legs usually called the maxillæ.

We can well understand how an animal, which had one or two pairs of legs in the vicinity of the mouth, so modified as to enable it to get a greater quantity or variety of food, would possess a decided advantage in the struggle for life, and transmitting this favourable variation to its progeny, the process would tend to become accentuated, and would lead to the development of such organs as the mandibles and maxillæ of the Myriapods, and ultimately to the development of the cheliceræ and pedipalpi of the Arachnidans on the one hand, and the mandibles and maxillæ of insects on the other.

Existing Myriapods have the pair of legs on the fourth somite further modified into a second pair of maxillæ, which are homologous to the labium of insects. The origin of this remarkable transformation of legs to jaws may be easily understood by anyone who will watch a cockroach feed. The action of the jaws of this insect may be described as follows: The mandibles, the organs of the second somite, seize as well as bite the food, the maxillæ, the organs of the third somite, not only bite but push the food into the mouth, showing how these organs have retained their ancient function of helping to bring food to the mouth. It is worthy of notice that young Myriapods grow by addition of segments posteriorly in a manner very suggestive of many worms, and the reverse of that process of coalescence which shows itself in adult Myriapods, and more strikingly in the higher classes. In some species of Myriapods also there is a tendency for some of the tracheæ to be aggregated and open on the dorsal surface, in a manner suggestive of the pulmonary sacs of spiders and scorpions.

At a higher level than Myriapods is the somewhat heterogenous class, the Arachnida, comprising some four orders: typical representatives of their species are scorpions, spiders and mites. This class includes animals of extraordinarily different forms, from the scorpion to the minute Tardigrada. Many of them, particularly amongst the mites, are parasitic, whilst the great majority of the species live upon the juices of other animals.

The number of the body segments throughout this class is considerably reduced, and in all the species the tendency to coalesce is obvious. Their total number never exceeds nineteen, and is usually fewer. It must be understood that when we say that the class Arachnida follows closely upon the Myriapods, it is not meant to assert that a Myriapod was the immediate ancestor of the varied forms which are now grouped as Arachnidans; but that various modifications arose from various species of Myriapods, and such of these as possessed four pairs of ambulatory legs are called Arachnidans. It is an interesting fact that none of these eight-legged descendants of Myriapod ancestors possess antennæ. Why this should be it is impossible to say, but that it is, somehow or other, due to the internal constitution of the animal is evident. All the other air-breathing Arthropods, whether higher or lower, possess antennæ, but those which have eight legs never possess those organs of touch. All the Arachnida possess cheliceræ, which are homologous to the mandibles of Myriapods and insects, and pedipalpi,which are homologous to the maxillæ of those classes; and since the pedipalpi though formidable weapons are frequently used as organs of touch, thus rendering the antennæ unnecessary, these latter have been first disused, and have subsequently disappeared.

As a justification for the assertion that all Arachnidans are descended from ancestors which, if we could see, we should without hesitation describe as Myriapods, we may refer to the fact, that embryo spiders and scorpions have limbs on the abdominal somites. These legs, being functionless in the embryo, and absent in the adult, surely point to a many-legged ancestor. Since not a few of the smaller spiders float through the air by means of delicate threads, which they exude, and trust to the kind action of the wind to find resting-places, it is evident that if the power of flight had been obtainable within the Arachnidan group it would have been of great advantage to its possessors; but seeing that this group is essentially terrestrial, and that its progenitors have never, since they emerged from the worm-type, resumed aquatic life, there has been no chance of developing organs homologous to insects' wings, which are nothing more than the modified gill-leaflets of a once aquatic form. The tendency for adjacent tracheæ to coalesce and form a sort of purse-like pulmonary sac, incipient in some centipedes, reaches its culmination in spiders and scorpions; in the latter, tracheæ, as such, have disappeared, but their compressed and coalesced representatives, the four pairs of pulmonary sacs, perform the respiratory function. In spiders, tracheæ, as such, persist, but there are, in addition, one or two pairs of respiratory sacs.

Passing to the Thysanura, which are often described as primitive insects, we find a class which in some measure justifies the use of that expression, though it cannot be regarded as representing the ancestral type of the true insects. Thysanurans possess antennæ, mouth parts comparable to those of true insects, three pairs of legs, and a tracheal breathing system; but there is not the slightest trace of wings. This proves, or at least renders it highly probable, that the Thysanuran, like the Arachnidan, is the descendant of a terrestrial form; that there has not been any aquatic form in its ancestry since the emergence from the worm type. Some of the species have legs on the abdominal somites, suggesting relationship to the Myriapods. These abdominal legs occur in the adult, and not merely in the embryonic form as is the case with spiders and scorpions. As showing the intimate relationship of the air-breathing Arthropods, we may point out, that if the two legs which in the Thysanura, as in true insects, are modified to form the labium, that is the lower portion of the mouth, had retained their primitive form of ambulatory instead of biting organs, then the Thysanurans instead of being described as primitive insects would have been transferred to the other class, and called primitive Arachnidans.

We have so far been treating of the apterous Arthropods, we come now to the winged members of this group, which constitute the class Insecta, which contains by far the greatest number of species and individuals of any class of animals. Of course there are some apterous insects, but in all there is good reason for saying that the wingless are descended from winged forms. This fact alone is decisive, and places it beyond doubt that the whole class Insecta are descended from aquatic ancestors; aquatic ancestors not in the sense in which all animals are so descended, but in the sense that some descendants of the primitive peripatus-like Arthropods which, as we have seen, were terrestrial forms became adapted for aquatic life.

This change of environment necessitated and was accompanied by changes in the structure of the respiratory system. The tracheal system did not cease to be strictly a tracheal system, but the mouths of the tracheæ became closed so as to exclude the water, and some of them, perhaps all, were surrounded by leaf-like outgrowths similar both in structure and function to the gill-leaflets of many modern ephemerid larvæ. It has been shown how from an ancestor which had gill-leaflets down each side of its body there arose forms in which the thoracic leaflets were larger, and since all these leaflets possess some power of movement the transition from the gill-leaflet, a breathing organ, to the wing, a locomotory organ, was effected; it is scarcely necessary here to say that structurally an insect's wing resembles the gill-leaflet of an ephemerid larva. Since no individual of any of the other five classes of air-breathing Arthropods has any trace of wings, we may certainly say that there has been no reversion to an aquatic life amongst their ancestors since they emerged from the worm type and reached the peripatus level.

The power of flight which the large majority of insects possess has doubtless been the cause of their success in the struggle for existence, and has led to the enormous multiplication of their species, and individuals. Every insect has six legs, and (save a few apterous forms) one or two pairs of wings.

The class Insecta is divided into many orders, some entomologists making 16, but I prefer to restrict the number to 8, viz., Orthoptera, Neuroptera, Trichoptera, Hymenoptera, Coleoptera, Hemiptera, Lepidoptera, and Diptera. The first five have mandibulate or biting mouths, the last three haustellate or sucking mouths. Although there is great difference between the two kinds of mouths, yet a close examination shows that both are but modifications of the same parts. They are six, the labrum or upper lip, which is a median plate formed from the lower portion of the head. There are two mandibles, two maxillæ, and a second pair of maxillæ, which form the labium. Wherever we find appendages to the mouth they are situated on the lower parts, viz., the maxillæ or labium.

Wonderful as these modifications are, yet we can trace the development of them all from ambulatory legs. It may seem incredible, but it is nevertheless true, and the transition may be indicated by pointing out that the proboscis of a butterfly is developed from the maxillæ of the caterpillar, the rostrum or beak of the bug from the labium of the biting insect; the tongue of the bee from the lining of the inside of the labium, whilst the simpler forms of labia plainly show relationship to the second pair of maxillæ in those myriapods whose homologues in the still simpler Peripatus are locomotory organs.

Of the real relationship of the 278 thousand species of air-breathing Arthropods I have not the least doubt; whether I have succeeded in making it clear to my readers remains to be seen. It has not been my object to show the connection between the orders which make up the great classes, but between the classes themselves. The evidence adduced may by some be regarded as indecisive, but if the homologies be real, the inferences can scarcely be inaccurate. So far as I know, all the facts, anatomical, embryological, and palæontological, are in complete accord with the theory I have laid before you. This being the case, it may be provisionally accepted as a working hypothesis, with a strong balance of probability in its favour. Anyone who has gone deeply into any branch of Entomology, knows full well the difficulty of distinguishing closely allied species, and also knows that throughout any order there exists a general resemblance which may justly be called a family likeness. In a higher and not less true sense, orders and classes are related. Some are well defined; but many, even amongst existing forms, are connected by intermediate genera, whose structure indicates that they are the slightly modified descendants of forms ancestral to widely-separated modern genera. Of such, Peripatus is an admirable example, and may be called a finger-post on the upward road along which, during an inconceivably vast number of centuries, the army of air-breathing Arthropods has moved. During an almost illimitable past, this great sub-kingdom has gone on multiplying and becoming more and more specialized, till we have now such a wealth both of species and individuals, that no man can possess a complete knowledge of more than a small part of them.

THE PTEROPHORINA OF BRITAIN.

BY J. W. TUTT, F.E.S.

(Continued from page 10.)

This he agreed to do, and, with Mr. A. J. Hodges, we set out about 9.30 a.m. for the scene of action. We had scarcely reached that part of the Downs to which our footsteps had been directed, when Mr. Hodges came back to me with the news that as it was a Micro expedition he had only brought half-a-dozen boxes, and that each of these contained a *spilodactyla*. Hurrying up the lane where I had loitered, and arguing with my friend as to the position of "plumes" in general, I came across the veteran standing over a plant of horehound (*Marrubium vulgare*), and after a few minutes at a similar plant, I flushed my first specimen. Shaking the plant and herbage around was quite sufficient to disturb them, and as we had evidently just hit the time for the species, *spilodactyla*, for about an hour, had a rather bad time of it, and we boxed a fair number, the species evidently being just out and in fine condition. A search for the pupa resulted in finding many empty pupa cases but only one or two living ones. The empty pupa cases were conspicuous enough, but the full ones assimilated so well to the leaf on the midrib of which on the upper side they are placed, that it was difficult without a little practice to detect them. The natural time of flight appears to be about five to seven p.m., but they appear to be rather sluggish, and at the most flit from one part of a plant to another. In the daytime a fair amount of shaking is needed to disturb them."

Mr. Sydney Webb states that from observations he made on this species, specimens of which he kept on plants established in his garden, he came to the conclusion that it was "distinctly double-brooded," the first brood appearing as imagines "from the 3rd to 6th of July," whilst slowfeeders sometimes did not emerge "till the end of the month." "At the end of August," Mr. Webb further states, "pupæ may again be found," and the imagines from these appear in "the first week of September." I have never seen this second brood myself, nor have I been in its locality at the time it should occur. Mr. Webb adds:—"The eggs laid by these produce young larvæ, which hybernate upon the stems, and amongst the downy young leaves at the top of the plant when about one-eighth of an inch long. The parent deposits its eggs singly, placing them in one of the natural depressions on the lower surface of a leaf. The time chosen for this operation is in the waning evening light, just before dusk sets in."

HABITAT—The food plant of this species is local in Britain, and the area of distribution of the species is limited. Almost all our specimens come from the Isle of Wight, where it abounds in certain localities, but Messrs. Nelson Richardson and Eustace Bankes take the insect in the Isle of Purbeck, and Mr. Sydney Webb has (I believe) reported it from Kent. At Freshwater, it is found on plants which grow on the most exposed situations on the Downs, as well as on those growing at the foot of the Downs and sheltered both by the Downs and the hedgerows. Wocke gives as its area of distribution:—"England, France, Germany, Italy, Spain, Southern and Eastern Russia, Greece" ("Catalog," p. 344); so that it is quite a Southern species and illustrates the fact that many of the species more or less confined to the Mediterranean littoral appear on the southern shores of Britain.

Aciptilia galactodactyla.—In our own Southern counties this is certainly one of the commonest plumes, and is, perhaps, more frequently bred than any other species in Britain.

SYNONYMY—*Galactodactyla*, Hb., 2; Tr., IX., 2, 250; Ev., 'Faun. Vol. Ural.,' 609; Haw., 'Lep. Brit.,' 475; Stphs., 'Ill.,' IV., 371; Zell., 'Isis' (1841), 857, Pl. 4, 35; 'Linn. Ent. Zeit.,' VI., 390; H.-S., V., p. 384. This very distinct species appears to have had no synonyms, indeed it would have been strange if so distinct a species, inhabiting as it does those parts of the Continent where collectors most do congregate, had received any other names, although it must be confessed that Hübner's type figure, good as it may have been when first drawn, is now of an unicolorous blackish-grey through the oxidation of the paint.

IMAGO—Ground colour pure sheeny white; the four wings divided into two lobes by a deep fissure; both lobes acute, the lower somewhat falcate. The markings in *galactodactyla* are much fewer than those in *spilodaclyta*, but those that are present agree in position with similar ones in the latter species. The angulated fascia at the fissure consists in *galactodactyla* of a costal mark, faint shade to the fissure, a black dot at the end of the fissure and a faint shade in the lower lobe, which becomes distinct in the fringes. Two (and even three) small black dots are found in both lobes towards their apices; a tiny black dot is also found in the centre of the wing midway between the fissure and the base. Hind wings consist of five plumules, white, with grey fringes.

It seems next to impossible to disturb the moths by day, but in the evening they may be found moving freely about the food plant. Stainton's diagnosis is as follows:—"9‴—11‴. F.-w. white, with two black dots before the fissure, and several black dots round the tips of the lobes" ("Manual," II., p. 444). I have already mentioned that Hübner's figure cannot be described.

LARVA—The larva of this species is excessively abundant on *Arctium lappa* in the clearings of almost all our Kent woods. It feeds on the youngest leaves, and its long white hairs and pale green ground colour render it very inconspicuous when it is resting, as is usually the case, by the side of the midrib or one of the larger veins of the undersides of the hirsute young leaves of its food plant. It eats through the lower epidermis and clears out the parenchyma in the form of little round holes, leaving, however, the upper epidermis intact. This does not show at the time, but as the leaves get older and larger, the epidermis which has been left gives way, and the plant looks as if it had been riddled again and again with shot. By the time the leaves are in this condition, they are forsaken and the larvæ have sought pastures new on the young leaves at the centre of the plant. It is really remarkable how many larvæ may sometimes be obtained from one plant, but I have occasionally found as many as 40 or 50 on a not very large plant, and 20 is quite a common number. They are remarkably protected, however, and I have looked over a plant five or six times and found larvæ each time that I had overlooked previously. As the larvæ get older the hairs are proportionally shorter, and hence they get greener, following, it seems, the fact that the leaves also lose their characteristic hoary whiteness as they get older. Stainton simply says:—"Larva on burdock. V." ("Manual," II., p. 444). Mr. Griffiths records larvæ as late as June 24th, at Dursley, in 1890. In that year I bred the moths from Reading larvæ on June 6th. Of the larva of this species Mr. Porritt writes as follows:—"During June last, I bred a nice series of this very pretty 'plume,' from liberal supplies of larvæ sent me by Messrs. W. H. Grigg of Bristol and F. D. Wheeler of Norwich; from the two lots of larvæ it would appear they attain full growth sooner or later in different localities, for the larvæ from Bristol were spinning up when received in the first week in May, and were all pupæ when the still smaller larvæ arrived from Norwich at quite the end of the month. They were feeding on the under side of the leaves of the burdock, eating through, and quite riddling the large leaves.* Length about three-eighths of an inch, and of moderate bulk in proportion; the head has the lobes rounded and polished, and is considerably narrower than the 2nd segment; body rounded at the subdorsal region, slightly flattened dorsally, and still more flattened ventrally; it is attenuated posteriorly, and also from the 3rd segment to the head; tubercles large and prominent, each of them emitting a tuft of moderately long hairs; skin very slightly roughened, and the segmental divisions well defined. Ground colour of the head and body, uniformly pale pea green, the mandibles brown; two rather distinct grey lines extend through the dorsal region, enclosing between them the less distinct narrow, grey, medio-dorsal line; there is an indistinct row of grey spots substituting the subdorsal line, and the spiracular ridge is also greenish grey; hairs grey, those from the side tubercles stand out horizontally and are slightly curved, giving a remote resemblance to the larva of *Acronycta leporina;* ventral surface uniformly of the pale green of the dorsal area. When full-fed the larva spins a patch of silk on the under side of the leaf or on the stem of the burdock, or on any convenient object near, and in a few days changes to a pupa" ("Entomologist," Vol. XIV., pp. 117, 118).

Pupa—The larvæ pupate in some cases on the food plant, but a large number must wander off and pupate on surrounding objects, as only a small proportion, compared with the number of larvæ, are ever found on the food plant. In colour they are bright green, covered with short hairs, and this I have found to be constant in a state of nature. But in confinement, and especially if the food or tin (in which I have kept them) has got damp, there is a very strong tendency for the tubercles to become dark, and the whole dorsal area of the pupa to develop as it were a double row of black spots. Just before emergence they turn white, the colour of the wings and body showing distinctly through the pupa case. The pupa is attached by its anal segment, and is capable of turning backwards until the head almost touches the anal segment. Mr. Porritt writes of the pupa:—"This, though laid flat, is attached to the silk by the anal hooks only, there being no silken belt around the body. Like others in the genus, it is somewhat similar to the butterfly pupa, or to that of an *Ephyra*; it is about five-eighths of an inch long, and of average proportions; thorax and head rounded above, flattened beneath; head, bluntly rounded off; the leg and wing-cases extend half way down, but are detached from the abdomen. Ground colour bright green; two distinct white stripes extend from the thorax to the tip of the abdomen, and

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*I have had many dozens of the larvæ, and can state positively that the larvæ rarely feed on the older leaves. The riddling of these leaves is due to small holes being eaten in them when the leaves are young, the natural growth of the leaf extending the holes afterwards.

outside these stripes on each side of the first two abdominal segments are two conspicuous black spots, one on each side, and there is a faint indication of similar spots also on the other segments. As in the larva, each tubercle emits a tuft of grey hairs" ("Entomologist," Vol. XIV., p. 118).

Time of Appearance—The larva may be found in April and May, and the moths appear in June. In confinement the moths from the same brood seem to appear almost simultaneously, and I have never taken specimens at large later than the first week in July; the latter month is that given in the "Manual."

Habitat—This species is rarely found in abundance in thick woods, but it abounds in the clearings of woods in Kent, where the burdock grows sometimes to an enormous size. I have also found it on plants growing on the chalk hills at some little distance from the woods, but plants quite on the borders of the woods are most productive. Captain Robertson found the larvæ in abundance in Hampshire, and I have taken it at Maidenhead. I have no notion how far north it extends. Stainton gives:—"Bristol, Cambridge, Kingsbury, Pembury and Tenterden" ("Manual," II., p. 444). Mr. W. F. de V. Kane records this species from "Wicklow" (*in litt.*); Mr. Cambridge from "Wareham (common)"; Mrs. Hutchinson, from "Leominster—larvæ occurring in May and sometimes into July, on burdock;" Mr. Porritt, from "Barnwell Wold (abundant)," etc. Drs. Standinger and Wocke give "Germany, Hungary, Southern Russia and Armenia" as its range.

Aciptilia pentadactyla—This, supposed to be the most common of all our British species of "plumes," is certainly the most beautiful. Its sheeny whiteness, without a single dark spot or marking, is hardly to be compared in any other species of the moths, whilst its larger size, throwing up the feathered characters of the group in the most striking manner, attracts even the eye of the uninitiated, and compels admiration by its quiet beauty.

Synonymy—*Pentadactyla*, Linn., 'Sys. Nat.,' X., 542; 'Faun. Suec.,' No. 1457; Tr., IX., 2, 249; Hb., 1; Haw., 'Lep. Brit.', 475; Stphs., 'Ill.,' IV., 371; Dup., XI., 314, 8; Zell., 'Isis' (1841), 844, 862; 'Linn. Entom.,' VI., 397; H.-S., V., p. 385; Frey, 419; Sta., 'Man.,' II., 444. *Albus*, Geoffroi, 2, 91. *Tridactyla*, Scop., 'Ent. Carn.,' No. 675.

Imago—The fore-wings are divided into two lobes, the apices pointed, rather falcate; the colour pure sheeny white, without any markings whatever. The hind wings, divided into three plumules, also pure white. Stainton's diagnosis is:—"1″ 1′—1‴ 2‴. F.-w. white, sometimes sparingly dusted with grey; h.-w. entirely white. VI—VII." ("Manual," II., p. 444). The original description of this species is as follows:—"*Alucita* alis patentibus fissis quinquepartitis niveis: digito quinto distincto" ("Systema Naturæ," Xth., p. 542, No.

304). In addition we read:—"Major reliquis nostratibus et tota nivea. Thorax fasciculi tribus. Alæ superiores ultra medium bifide margine postico ciliatæ. Inferiores quinquepartitæ: quinto libero; rachidibus omnium imbricatis squamis" ("Fauna Suecica," No. 1457). There is no doubt that the phrase "Inferiores quinquepartitæ" is an error. The term "quinquepartitæ" should be applied to both wings combined.

Ovum—Mr. Albert Müller writes the following notes on the oviposition of this species. He says:—"At eleven o'clock in the evening of the 18th July last, a 'plume,' which Mr. Stainton has kindly determined as above, came to my lamp, and at last settled on the book I was reading. After being confined for a few minutes under a glass bell on the mantelpiece, it laid, at intervals of a few seconds, eleven minute, oval, white, semi-opaque ova. The next morning I found it lying dead on the eggs, which were loosely scattered about. Mr. Stainton having informed me that the larva eats leaves of *Convolvulus arvensis* in May, I conclude that the 'plume' was attracted by two pots planted with an exotic *Convolvulus*, and standing in the immediate vicinity of the window through which it made its entrance" ("Entomologist's Monthly Magazine," Vol. IX., p. 144).

Larva—The larva of this species is of a green colour, almost exactly of the shade of the convolvulus leaves on which it feeds, with a yellow spot on the posterior portion of each segment. Mr. Porritt writes:—"On the 4th of July of last year, I received eggs of this species from Mr. W. H. B. Fletcher, deposited by a moth he had taken at Worthing. Five days later they hatched, and the newly-emerged larvæ were white, and clothed with long white hairs. They fed for a short time on convolvulus but hibernated early, when still very small. In April, they re-commenced feeding, but by the 15th were only a little over a quarter of an inch in length. From that time they grew rapidly, and by the 5th of May, the largest was nearly full-grown. Length, nearly three-quarters of an inch, and of average build. Head polished, it has the lobes rounded, and is a little narrower than the second segment. Body cylindrical, and fairly uniform, tapering only a very little towards the extremities. Segmental divisions clearly defined, the tubercles prominent, and from each of them springs a tuft of moderately stiff hairs; in the tuft of hairs from the tubercles on segments 2, 3, 4, 12 and 13, is a single hair much longer than the rest, which stands out very conspicuously. Skin, soft and smooth, but only very slightly glossy. Ground colour of a median shade of dark green, exactly the colour, indeed, of the convolvulus leaf, on which it feeds. On the dorsal area, however, the ground colour only appears as a large lozenge-shaped mark on each segment except the 9th, the remaining space on each segment and the whole of the 9th segment being filled with bright lemon yellow. The darker green alimentary canal shows through as the dorsal line; there are no perceptible dorsal lines, but there are long and continuous whitish streaks along the posterior half of the spiracular region. Head bright yellowish-brown, the mandibles reddish-brown, and the ocelli black and distinct. Tubercles intensely black, the hairs greyish. The imago from this larva was out on the 31st May" ("Entomologist's Monthly Magazine," Vol. XIX., p. 187). Mr. South gives the following description of the larva:—"Length, 8 lines; fairly stout, tapering slightly posteriorly. Head smaller than second segment, shining, yellowish; face pale greenish, a dark-brown spot on each cheek; mandibles pale brown. Ground colour green; the dorsal area is margined by narrow whitish lines running from the 3rd segment; on these lines at the posterior edge of each segment is a large, somewhat triangular yellow spot, the enclosed ground colour is thus formed into a series of lozenges, intersected by the darker intestinal canal; the yellow spots on the 9th segment coalesce, forming a conspicuous blotch. Tubercles, two dorsal rows (two on each segment), black from 5th to 11th segments inclusive, the others are of the ground colour; each emits a tuft of hair of unequal lengths, the shorter ones are whitish and the longer dark grey; two long grey hairs project over the head from the edge of the 2nd segment, and there are also single grey hairs of considerable length rising from each of the dorsal warts on the 2nd, 3rd, 4th, 11th and 12th segments; those on the anterior segments stand nearly erect, whilst those on the posterior segments curve backwards. Subdorsal, a row of black warts with tufts of short whitish and longer dark grey hairs; the spiracular row of warts are transparent and emit hairs, as in the subdorsal set. Prolegs and anal claspers semi-transparent, tipped with pale brown. May and June, on convolvulus (*Calystegia sepium*), eating the leaves and flowers; rests on the underside of the leaves and on the stems" ("Entomologist," Vol. XVI., pp. 26—27).

Pupa—The pupa is attached by the anal segment to the food plant. It is of a green or greyish-green coloration, and varies somewhat considerably in the quantity of black dorsal markings which are arranged in three rows longitudinally. The pupa is described by Mr. South as follows:—"Pale green at first, afterwards greyish-green, with three rows of black dorsal spots; hairs similar to the larval arrangement; fastened by the tail to a leaf or stem. May and June" ("Entomologist," Vol. XVI., p. 27).

Habitat—The species is certainly widely distributed, but does not occur "everywhere," as some of our authors remark. Mr. Baxter of St. Anne's-on-Sea informs me that it does not occur in that part of Lancashire. It is recorded by Mr. W. F. de Kane from "Wicklow and Galway"; by Mr. A. W. P. Cambridge from "Wareham (common)"; by Mr. Sinclair from "Sutton, co. Dublin"; from "Leominster," by Mrs. Hutchinson as "Common in May and June on convolvulus;" but it is not included either in the Glasgow or Aberdeen lists in my possession. Stainton gives a long list of localities in the "Manual," but the most northerly appear to be "Darlington, Manchester, York and Scarborough (very common)." So that even such a common species as this appears to get rare in our more northern latitudes, although it is almost sure to occur freely in some parts of Scotland, as it is fairly common in certain parts of Scandinavia. Drs. Staudinger and Wocke give as its range:—"Europe (except the Polar region and Spain), Armenia, Siberia (west)" ("Catalog," p. 345).

Time of Appearance—The species appears from the middle of May until August, and there is possibly a partial second brood from the moths which are the earliest to emerge, although the species on the whole appears to be only single brooded. The May specimens are very infrequent, but the moth is abundant in June, July and August continuously, and I have always supposed, although I have no actual proof of the matter, that part of the larvæ from the eggs laid by the May moths usually feed up rapidly and emerge in late July or August, whilst part hibernate with the larvæ from the later moths. This is so generally the case with moths whose appearance is spread over a considerable period of time and whose larvæ hybernate that there is very good reason for supposing it may be so with this.

BYWAYS OF BOTANY: CLEISTOGAMOUS FLOWERS.

BY J. W. SOUTTER.

I.

As in exploring a country or a district we find that we get a better insight into its physical features, and its natural beauties, by leaving the beaten tracks or highways, which, useful as they are in getting over theg round, are yet in themselves frequently dry, arid, and uninteresting; but as by turning aside into the unfrequented lanes or footpaths we unexpectedly come upon hidden nooks of surpassing beauty—charming corners of lovely scenery—which the ordinary routine tourist misses entirely; so in the study of science, it is these more obscure and untrodden bypaths that furnish the student with his rarest insight into the marvellous variety of devices whereby mother Nature attains her ends. So in considering the structure of cleistogamous flowers, we endeavour to traverse one of the less beaten paths, one readily overlooked, but none the less fascinating.

Cleistogamous, from the Greek κλξιστος (*kleistos*), hidden, and γαμος (*gamos*), marriage, is applied to those plants in which the organs and processes of fertilisation are hidden or concealed. The perusal of this curious chapter of nature's volume has only been attempted in quite recent years. It was the painstaking genius of the late Charles Darwin that first popularised it to the average botanist. The veriest tyro in Botany knows the functions of the various parts of the flower. The calyx and corolla, to shield or protect the more delicate essential organs; the stamens, containing the pollen, which has to be conveyed to the stigma in order that fertilisation may be accomplished and seeds produced. This process is usually very obviously performed, and the showy flowers and attractive blossoms are all necessary for their proper functions. The ordinary observer is very apt to overlook those plants in which there are no conspicuous blossoms, but there is quite a number of plants which, besides producing a series of well-developed flowers, at another stage also bear blossoms which never expand at all. One of the most familiar and striking examples is furnished by the common Wood Sorrel (*Oxalis acetosella*) of our woods and lanes. In early Spring it produces an abundance of its pearly white and delicately veined blossoms, nestling amongst its lovely green trifoliate heart-shaped leaves, which makes it often taken for the type of the Shamrock. These Spring blooms are showy, handsome and attractive, and also less or more fertile. But besides these it forms in Summer low down near the roots, indeed frequently buried in the soil, minute flowers which never expand at all, but yet produce abundance of seeds; indeed they are far more prolific than the earlier and gaudier blossoms. These cleistogamous flowers are produced at the least possible expenditure of vital force by the plant. There is no large showy corolla to manufacture, nor a profuse amount of pollen the bulk of which is wasted; but only a few grains of pollen are formed, which are conveyed direct to the stigma, and there perform their function of fertilising the pistil without any waste of energy or material; and cleistogamous flowers invariably develop a large number of perfect seeds. The well-known Sweet-scented Violet (*Viola odorata*), which adds such a charm by its fragrance to our English lanes in Spring, also produces these concealed flowers in Summer. The fragrant blooms of Spring are only sparingly fertile, so the plant is largely dependent on these obscure flowers for its seed supply. Anyone can detect these for themselves; they appear like minute buds at the extremity of the flower stalks, and more closely resemble the mature seed vessels than unexpanded flower buds; they are usually quite hidden by the leaves and require to be searched for. The Red Dead Nettle (*Lamium purpureum*), and its congener the Henbit Dead Nettle (*L. amplexicaule*), common garden weeds, also furnish familiar examples of this most interesting floral freak.

HOW DO ANIMALS BREATHE?

BY A. J. JOLLEY.

(Continued from page 13.)

The place of the so-called tracheo-branchiæ is, in the larvæ of dragon flies, taken by folds of the walls of the rectum. These folds contain numerous fine tracheæ, and these obtain oxygen from water which is constantly pumped into and out of the rectum.

Many of the aquatic Arthropods, for instance crabs and lobsters, have true gills, which are externally projecting processes of the body or limbs, but in this group, as in the others already referred to, many of the lower members possess no special respiratory organs.

Perhaps the most remarkable development of the Arthropod breathing apparatus is found in some Arachnidans, as the group to which the scorpions, spiders, and mites belong is called.

Scorpions breathe by pulmonary sacs which are also possessed by spiders. The scorpions usually have four pairs of these sacs; each has one external opening, and internally is broken up into a number of folds in which the blood circulates and takes up oxygen. The folds present an appearance not unlike the partitions of a purse or pocket book, with the difference that a purse usually contains only two or three folds, whilst the arachnidan's sac contains perhaps twenty.

Spiders have one or two pairs of these sacs in addition to a tracheal system, somewhat like that of the insects. Water spiders, like water insects, do not possess gills; they take down minute air-bubbles amongst the hair-like growth which clothes their bodies, and some take down a large bubble held between the spinnerets.

In the curious group Echinoderms, to which the star-fishes belong, there are no special respiratory organs, unless certain small plume-like developments are to be regarded as gills. Like many other animals which are destitute of special respiratory organs, the oxygen necessary to the life of the animal enters the system through the alimentary canal; it is evident that a considerable quantity of water enters with the food and the oxygen held in solution enters into the system through the walls of the alimentary canal.

We have now to examine the great division of the animal kingdom to which we ourselves belong, and will first notice a distant cousin, the Balanoglossus. This remarkable little worm possesses a dorsal rod closely resembling the notochord of young lampreys and sharks; its central nervous system is dorsal, and its gill apparatus is very similar to that of the lancelet. In its larval form it closely resembles the young of some of the Echinoderms, and we have thus very suggestive hints of the relationships of forms apparently widely separated, and from the life history and anatomy of this lowly member of the great backboned family we may learn many important lessons.

The animals collectively spoken of as Tunicates, though, on the whole, of higher organization than Balanoglossus, do not possess so fish-like a breathing apparatus. They breathe by a branchial sac which in proportion to the size of the animal is usually large, and through which a constant flow of water is maintained by muscular contraction. Into this sac (just as is the case with the fish's mouth) the water and food is taken; the food passes through an orifice into the alimentary canal, whilst the water flows through gill-slits in the sac-walls, bathing the blood vessels and aerating the blood; and ultimately is expelled from the organism through the same orifice as the waste products of digestion. In the lancelet, which is often spoken of as a vertebrate, the gill apparatus is fairly comparable with that of Balanoglossus; the gill-clefts are very numerous, and extend backwards nearly to the middle of the body, differing in this respect from all the true fishes. In the early stages of development these gill-clefts open freely to the exterior, and the water entering through the mouth flows out through them. In the adult form two lateral folds of the skin cover the external openings of the gills, and thus form pouches or sacs, which posteriorly unite and form a tube which discharges the water through an orifice a little in front of the anus.

In the true back-boned animals respiration is principally if not entirely effected by the coloured corpuscles of the blood, which, mainly owing to the presence of hæmoglobin, possess great powers of absorbing oxygen, which they take up from the surrounding medium (water or air) as they pass through the delicate blood vessels of the respiratory organs (gills or lungs). These coloured corpuscles are usually oval or circular discs, and in the lower vertebrates they are much fewer in number, and generally larger in size, than in the higher animals. The very much greater number of blood discs in the higher animals, and the greater proportional aerating surface offered by every one of that number, enable these animals to take up a much greater quantity of oxygen, and the vital processes generally are consequently much more active. It is obvious, however, that the apparatus of respiration must also exert considerable influence on the vitality of the organism, and that those animals which derive their oxygen from the water which holds it in solution must rank low or high in the scale as their gills are more or less simple. In all adult fishes water is taken in at the mouth, forced over the gills, and thence out again through one or more orifices. The hag, which is perhaps the lowest true fish, has, externally, on either side the neck (if we may use the word) seven little holes; there are corresponding holes in the pharynx; these holes are the ends of as many little pipes or tubes which admit the water into slightly flattened round sacs; these sacs are lined with a delicate membrane through which the exchange of gases between the blood and the water is effected; in other words, the hag has on either side seven gill-sacs; each sac being separate and distinct. In the lampreys we find a somewhat higher type; the sacs are distinct, but are relatively larger, and instead of communicating with the pharynx and exterior by tubes, open by little orifices directly. It is to be noticed that the sacs are more flattened and much nearer together than in the hags. In all the suctorial fishes the water is both admitted and expelled through the fourteen gill-orifices when the animal is adhering to any object, animate or inanimate, with its mouth. Passing to a higher group of fishes, the Elasmobranchii (sharks and rays), we find the gill-sacs still more flattened antero-posteriorly; the communication between the sacs and the exterior being through slit-like orifices, not circular ones. The septa, or partitions between the sacs, are very slight, and the lining membrane is raised into folds. In the highest member of this group (chimæra) we find the first trace of the gill cover. Passing to higher groups we find the septa, which internally are supported by the branchial arches, gradually diminishing in outward length; whilst the membranous folds extend as far as previously, so that they reach beyond the septa; with the result, that instead of a septum or sac wall reaching from each branchial arch to the exterior wall of the body, and supporting for a part or even the whole of that distance distinct membranou folds, we have the membranous folds developed into free gills, whose only external protection is the operculum or gill-cover. In the highest fishes, if the gill-cover be removed, each branchial arch with its free gill looks like a comb; but a closer inspection of what at a casual glance resemble the teeth of a comb shows that there are two rows of teeth or gill-plates, not paired, but alternating, and that each is a gill or gill-plate in whose minute blood vessels the aeration of the blood is effected. In some fishes even the lamellæ, as the gill-plates are called, tend to be still further broken up and offer an increased respiratory area. It will be obvious that the gill-plates represent the membranous folds of the lower fishes. The young of many fishes possess external gills resembling in structure those of the perennibranchiate batrachians, or those possessed by the tadpoles of frogs and newts. Similar gills, as well as internal ones and lungs, are possessed by those very remarkable fishes, the Dipnoi, of which there are only three known existing species. If we only examine the breathing apparatus of the existing icthyopsidans we shall find many difficulties in the way of the doctrine of descent, but when we examine the fossil forms many of those difficulties vanish, and there can be no doubt that a fuller knowledge of the fauna of the carboniferous period (to say nothing of the others) would remove the residue of these difficulties, which after all should scarcely create surprise if we remember the enormous lapse of time since the deposition of the coal beds, at which period, millions of years ago, fishes and batrachians, almost if not quite as widely differentiated as existing forms, flourished upon the earth, and were themselves the descendants of a line of ancestors, all vertebrate, who had been gradually varying and developing during the almost immeasurably vast epochs during which the old red sandstone beds were being deposited; not to speak of the lapse of time between that and the Silurian, a period which would be more interesting than any subsequent one, had we but a complete record of its palæontology, for then was bridged the gap which separated the vertebrates from all other animals, and a stride made greater than any in the biological history of our planet between the formation of the first protist and the birth of the first man.

The lungs, the organs of respiration of terrestrial vertebrates, occur, as previously mentioned, amongst animals which also possess gills, enabling them to breathe in water and constituting them amphibians in the strict sense of that word.

It has also been mentioned that one group of fishes, the Dipnoi, possess lungs, and are thus enabled to survive during the long, dry season when the tropical rivers which they inhabit become dry.

There are only three existing species of these remarkable fishes, whose skeletal structure closely resembles that of the ganoids, a group which certainly does not take high rank, and whose fossil representatives are amongst the very oldest of the vertebrates, some occurring in the Silurian period. The lungs of the higher animals are foreshadowed by the air bladders of fishes, and are but a higher development of them. Like lungs, air bladders arise as diverticula of the walls of the œsophagus, but their functions are widely different, and the arrangement of the blood vessels also differs, air-bladders being surrounded by vessels which in approaching contain arterial and in passing away venous blood; in other words, there is no aeration effected in the air-bladder, speaking generally. The function of the air-bladder is to alter the specific gravity and facilitate the ascent or descent of the fish in the water. It is usual for the air-bladder to arise from the dorsal wall whilst the lungs always arise from the ventral wall of the œsophagus. There are exceptions, however, to this rule, and these exceptions indicate the line of descent of the lung-breathing vertebrates. One of these exceptions is the genus Polypterus belonging to the Crossopterygian section of the Ganoid river fishes; in it the air-bladder arises from the ventral wall of the œsophagus, exactly as do the lungs of the Dipnoi and all higher animals. We thus see that in some ancient Ganoid, like the existing Polypterus, the air-sac arose on the ventral side of the œsophagus. Under conditions like those of the sub-tropical rivers inhabited by the existing Dipnoi, or Australian, African and South American mud fishes, this air-sac became physiologically as well as morphologically a lung, and the passage thence to the batrachian, reptilian, and mammalian lung is made by a number of gradations which leave no difficulties in the way of even the most doubting disciple of the doctrine of descent.

As previously stated, the lungs arise as a growth from the ventral wall of the œsophagus; the primitive lung-sac communicates with the œsophagus directly; but in the higher forms it is, as it were, pushed back, and the communication takes place through a tube, the trachea or wind pipe, of the higher animals. The condition of a simple sac communicating almost directly (that is, there is no true wind pipe) with the œsophagus occurs in the lowest existing Dipnoan, the Australian mud fish, Ceratodus; though even in Ceratodus, the lining membrane forms bands and net-works, giving a greater aerating surface than if it was quite smooth, and thus showing that even in this mud fish the lung is of too high an order to be regarded as similar to the first lung that was ever developed. In the other two existing species of this remarkable group of fishes, the lungs are distinctly paired posteriorly.

In the batrachian group, there are always two lungs; that is, the process of sub-division in the primitive lung-sac has been carried further in all the batrachians than in any of the Dipnoi, although in some (Menobranchus and Proteus) the inner surface is distinctly smooth, not forming bands and net-works as in the Dipnoi, and thus presenting almost certain evidence of retrogression. As a rule, in batrachians, the two lungs are equal in size; but in Amphiuma, Siren, and the Cæcilians, whose elongated bodies present a very snake-like appearance, the right lung is usually much longer than the left; in fact, in some Cæcilians, the left lung is almost atrophied. A similar variation occurs in snakes, and may be regarded as an adaptation of the respiratory organs to the elongated form of the body. Snakes—as is now generally admitted—are degenerate lizards; in other words, a snake is a lizard which has lost its limbs, and this retrogression is not confined to the skeleton, but affects the lungs also, the left lung being in most snakes quite rudimentary, and occasionally even absent. Speaking generally, the lungs of lizards are not so highly developed as is the case in other reptilian groups. Anyone who remembers that in the Crocodilia the heart is more complex than in any other reptiles will not be surprised that the lungs exhibit a correspondingly higher organization; but it is remarkable that in most chelonians the lungs are as highly specialized as in crocodiles.

The general direction of specialization of the lungs in reptiles is indicated, if we regard the lizard's lung as typical of that of the earliest true reptiles; the wind pipe leads into two bronchi, which open directly, one into each lung; the walls of the lungs are produced internally into numerous septa, which increase the aerating surface; these septa are most numerous near the bronchial opening; at the posterior extremity of the lung the surface is smooth and but little vascular; the ophidian lungs, as above stated, are retrograde from the Lacertilian type, but in the chelonians and crocodiles each bronchus instead of opening directly into its lung traverses its length, and by lateral apertures communicates with pouches each of which resembles the lung of an ordinary lizard.

In a few existing reptiles (*e.g.* Chameleons and some tortoises) we find traces of additional respiratory apparatus in the air-sacs which in some extinct reptiles and in the majority of birds, fossil and recent, attain a much greater development. In most birds these air-sacs lie not only amongst the viscera, but send prolongations into the bones, and even give off sub-cutaneous air-sacs; the result is not only a greatly increased aerating surface, but a diminution of the specific gravity of the animal, a peculiarity not indeed essential to flight but of great subsidiary importance. The anatomy of the lungs and diaphragm, which latter is present in a more or less complete state in many reptiles, supports and confirms the definition of a bird as a specialization of the reptilian type for flight.

In the highest great division of the back-boned animals, the milk-givers, who suckle their young and are scientifically designated Mammalia, the lungs attain their highest development; widely as the members of this great division differ in structure and habits, all breathe by lungs, and if deprived for more than a very short time of oxygen, die. In all, there are two lungs, communicating with the wind pipe by bronchi which divide and sub-divide (diminishing in diameter at every division) into minute tubes or bronchioles. Each bronchiole is a cylindrical tube which in turn divides dichotomously and rapidly several times, terminating in irregular alveolar passages. The air-cells lie in great abundance round these terminal passages and may be regarded as primarily hemispherical in form, though made polygonal by mutual compression. The connective tissue surrounding these air-cells is so disposed that all the cells derived from one bronchiole are more closely knit together than they are bound to those of a neighbouring bronchiole. It will be evident that each bronchiole, with the assemblage of its members, forms a miniature lung, usually called a lobule; the lobules are compacted together by connective tissue to form lobes, several of which go to make up each lung. The number of the lobes and bronchi varies in different groups of mammals, and is of some value in classification; occasional variations from the generic type occur, and the number of the lobes of the right and left lungs are usually different. For instance, in man there are two lobes in the left lung and three in the right; in the baboons, the left lung is two-lobed, the right four-lobed; in the group to which the hedgehog belongs the right lung is usually four-lobed, the left may possess from one to three lobes. As an instance of the classificatory value of bronchial peculiarities it will suffice to refer to the walrus, in which the right bronchus, before it reaches the lung, breaks up into two trunks, a large and a small, in this resembling the bears, to which a relationship is also indicated by the cranial skeleton of the walrus.

Whilst, as has been previously pointed out, the lungs are developed from the œsophagus, it must be remembered that in all lung-breathing vertebrates, some part, if not the whole, of the air required for respiration reaches the lungs not through the mouth but through the nostrils. These organs are connected with the olfactory as well as respiratory functions, and in fact primitively, are solely organs of smell.

Like the organs of sight and hearing, they arise as involutions of the integument, represented in the lowest fishes by a single sac, but in all the higher vertebrates by two, with which are connected nerve filaments from the olfactory lobes of the brain. It would require considerable time and the use of phrases embarassing to any but the trained anatomist, to trace the modifications of the bones of the skull, associated with the evolution of the nostrils of the Dipnoi from the olfactory sac of amphioxus, and we must content ourselves with the bare statement of the fact. It is evident that unless the entrance to the wind pipe from the alimentary canal is sufficiently protected either by something of the nature of a valve or by some modification of its primitive ventral position food would enter the lungs and speedily cause death. In most animals the anterior portion of the wind pipe is developed into the larynx, an organ which plays a most important part in the production of sound, and which communicates by a relatively small and narrow orifice with the alimentary canal; the adjacent parts are generally so modified as to reduce to a minimum the risk of food entering the lung. In some animals, however, no air reaches the lungs through the mouth, as portions of the larynx are modified to form a tube which extends across the alimentary canal and is firmly embraced by the soft palate, so that food passes on either side of this tube whilst the air-passages from the nostrils to the wind pipe are made continuous. This condition obtains in young marsupials, which are born in a very immature state and are placed by their mother in contact with her teats. The mouth of the little marsupial is completely filled by the teat, and it would be more accurate to say that the milk is pumped into it than that it sucks the milk in. It is evident that without the above-named modification of the larynx the animal could not live five minutes after its birth. The same may be said of the cetaceans, in which similar modifications of the larynx occur, and without which it would be impossible for them to obtain their food as they do, swimming open-mouthed in pursuit of their prey.

Another peculiarity, facilitating respiration, occurs in some cetaceans, and enables them to remain under water for longer periods than are possible for any other lung-breathing animal. Anyone who has watched a porpoise must have noticed that the contour of the front of the head is very convex, whilst on the other hand anyone who has seen the skull of the same animal must have been struck by its concavity.

The reason of this difference in appearance is, that in the living animal there is a spiracular chamber communicating externally with the blow-hole and internally with the nostrils ; there is a complicated system of valves and muscles by which the expiratory and inspiratory act is very rapidly performed, so that the animal only needs to be at the surface a very short time, and while under water can use air stored in its spiracular chamber.

It will be noticed that throughout this paper no attempt has been made to enlarge upon the chemistry of respiration, whilst some anatomical questions have been ignored or only incidentally referred to because their discussion would have involved an extensive use of technical phraseology and would not have affected certain general conclusions which, at the risk of undue repetition, may be briefly summarized.

It will, for instance, be evident that a classification of animals based solely on the respiratory apparatus would be in the highest degree misleading, and that the comparative anatomy of the breathing organs is only useful when employed in connection with an examination of the general structure of the organisms.

The comparative complexity of the breathing organs of an animal is a safe index of its position in any of the great groups so long as the comparison is restricted to members of that group, but no longer.

For instance, it is fair to say that a lung-breathing mollusc is a higher animal than a gill-breathing one; but it is not fair to say that a lung-breathing mollusc is higher than a gill-breathing vertebrate; in other words, a snail is higher than an oyster, but not than a herring.

Bearing this general rule in mind, let us briefly glance again at the groups into which animals are divided. All protists and zoophytes and some of the lower members of other groups are devoid of special breathing organs: they either take in oxygen from the water through the general surface of the body or else derive it from the water which enters the alimentary canal with their food. The lowest special respiratory organs are the water-vascular vessels which are possessed by some worms, and these form the starting point of a system whose highest development is seen in insects, and whose intermediate stage is indicated in the myriapods ; the fundamental structural arrangement is similar, the highest stage being developed and modified for air instead of water breathing.

In the same group as the insects we find two other methods of respiration, viz., by gills as in the lobster, and by pulmonary sacs or lungs as in the scorpions. Both these methods must be regarded as new developments, presenting no homology to the gills or lungs of any other groups of animals. The gills of the higher molluscs are homologous to those possessed by some worms, but the lungs of land molluscs, like those of scorpions, are a special development not homologous to similar organs in any other group.

The gill of the highest existing fish is the "lineal descendant" and "direct representative," if I may be allowed the phrase (it is simpler than homologous), of that of some worm-like form akin to the existing Balanoglossus; whilst the lungs of man form the last term of a series beginning in the swimming bladder of some ancient Silurian fish. I say the last term advisedly, for though some people talk glibly of an animal higher than man who in the far-off future will succeed us on this planet, it seems to me that such speculations are not only not supported by reason but opposed to it. When our planet had, in the inconceivably remote past, sufficiently cooled for its vaporous envelope to condense into an ocean whose temperature was low enough for the existence of living organisms, then living organisms appeared. How they came into existence we do not know, but may be allowed to protest against the unscientific assumption of some so-called scientific men who profess to deem it beyond reasonable doubt that the primordial protoplasm arose from the fortuitous concourse of the atoms of its constituents. So far as we know, the living always arise from the living, we have absolutely no experience of the living arising from the not-living: Many wonders have been worked in the laboratories of synthetical chemists, but this wonder of wonders has not yet rewarded the labour of patient students, and the soberest and profoundest of them can see no prospect of its achievement. To those who, on other grounds, believe in God and regard the universe as an expression of the Supreme mind, in itself in the strictest sense unknowable by us, it will not seem necessary to enlarge upon the absurdity of treating as a scientific truth the unscientific hypothesis which has found favour in the sight of some ultra-materialists, and whether we apply the term "creation" or "formation" to the appearance of the first living being on earth, either term simply serves to indicate our utter ignorance of how the first protist came into existence.

So far as we can judge from the geological record, the earliest specialization of the primitive protists was in the direction of foraminifera and diatoms, and the first organic rocks were formed by the heaping up on the ocean floor of their calcareous shells and siliceous cases. It is probable that for thousands of centuries no higher organisms than protists existed on earth, and that for periods long subsequent nothing higher than what we now regard as lowly plants and animals succeeded.

After many upheavals and depressions, accompanied as is probable by occasional earth convulsions of a violent character, by a gradual though slight diminution of temperature and by a much greater degree of specialization in the fauna than had occurred in earlier periods of equal length, came the commencement of what we call the carboniferous epoch.

During this period there were large tracts of land covered by a vegetation more luxuriant than any that has since existed; and this excessive growth is attributable to the presence of a relatively large proportion of carbonic acid in the air which stimulated vegetable life but did not permit the existence of the higher terrestrial animals. The general effect of this more than tropically luxuriant vegetation would be to diminish the proportion of carbonic acid in the air, and as a consequence we find towards the close of this epoch, that the field thus laid open was speedily occupied by lung-breathing vertebrates, adaptations for terrestrial life of what had previously been an exclusively gill-breathing order of animals.

The subsequent geological record supports that theory of the line of descent of man from this earliest lung-breather which has been already indicated. Some may ask: What has all this to do with animals breathing? I would reply with one of old: "Much every way." At the beginning of this digression I protested against the unscientific notion that some animals higher than ourselves should succeed us. Palæontology teaches us that as the earth has become fit for higher animals; higher animals have been developed. All animals, even the lowest, breathe; but the simpler forms of animal life can exist and even flourish where the higher ones would die. It would be much more scientific, that is it would be more in accordance with what we *know* as distinct from what we only think, to say, that as our globe cools down it will gradually become unfit for the higher forms of life, and that instead of being succeeded by higher forms there will be a time when, owing to the steadily changing conditions, the higher animals will gradually cease to exist, and instead of a tendency to increased complexity amongst living organisms the tendency will be in the opposite direction. Excluding from our consideration any idea of a catastrophic end of the earth and its inhabitants, and assuming only the continuous operation of existing forces, we may safely say that the great back-boned family, of which we are the highest members, has already existed for much more than half of its allotted time; millions of years have elapsed since the first vertebrate appeared, but it is extremely doubtful if vertebrate life will be possible on earth as far in the future as the coal period is in the past. Just as some fishes live at the bottom of the sea, we are living at the bottom of a great sea of air; a very slight change in the composition of either sea would suffice to annihilate the animals which inhabit it. We have reason to believe that the composition of both seas has varied in the past, and that their inhabitants have exhibited corresponding variations, those which failed to adapt themselves to their altered surroundings perishing. As in the past many races of animals have become extinct, so, at last, all now existing will die out. Instead of idly dreaming of imaginary higher forms who shall come after us, or pondering too much (as is quite possible) on those who have gone before, our life-work should be the moral and intellectual advancement of ourselves and our fellows, that there may be a realization of the poet's vision of those who,“ no longer half akin to brute,” shall look, eye to eye,

> On Knowledge; under whose command
> Is earth and earth's, and in their hand
> Is Nature like an open book.

REPORTS OF SOCIETIES.

THE SOUTH LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY,

Annual Meeting, 25th January, 1894.—J. Jenner Weir, Esq., F.L.S., President, in the chair.

This was the annual meeting, and no exhibits were made, the occasion being devoted to hearing the Treasurer's and Council's reports, and the address of the retiring President.

The President presented a handsome album to the Society, containing three of his photographs at different ages, and said he hoped that all the members would contribute their own, as such a collection would, in the future, probably be of great interest and value.

The following gentlemen were then elected the officers for the ensuing year:—*President*, Mr. E. Step; *Vice-presidents*, Mr. J. Jenner Weir, F.L.S., and Mr. C. G. Barrett, F.E.S.; *Treasurer*, Mr. R. Adkin, F.E.S.; *Librarian and Report Secretary*, Mr. Hy. J. Turner, F.E.S.; *General Secretary*, Mr. S. Edwards, F.L.S.; *Curator*, Mr. W. West; *Council*, Messrs. T. R. Billups, F.E.S., C. A. Briggs, F.E.S., J. H. Carpenter, F. E. Filer, F. W. Frohawk, F.E.S., J. Henderson, and R. South, F.E.S.

In his address the President showed fully the pleasures and advantages derived from the study of entomology. He spoke of the recent attention which had been given to classification, noticing especially the admirable work of Dr. Chapman, and made considerable reference to melanism, coupling therewith the results of the laborious experiments of Mr. Merryfield. After discussing at length the exceptional season and its effects on lepidoptera, he remarked with satisfaction upon the “ new life which the study of variation had given to the collecting of indigenous lepidoptera.” A graceful reference to the late Mr. H. T. Stainton as one, who “ being dead, yet speaketh,” and words of welcome to the incoming President, Mr. E. Step, ended a most able address.

February 8th, 1894.—E. Step, Esq., President, in the chair.

Mr. Carpenter exhibited *Xylophasia monoglypha*, Hufn., (polyodon, L.), both the dark and intermediate forms; also a form of *Agrotis cursoria*, Bork., not distinguishable from a southern form of *A. tritici*, all from Aberdeen.

Mr. W. F. Warne, a case of nearly two dozen species of Rhopalocera taken near Rockhampton, in Queensland, representing one morning's captures. They included *Anosia plexippus*, and *Deiopeia pulchella*.

Mr. W. A. Pearse, series taken by himself in Alleghany, U.S.A., during 1892-3, of *Pyrameis atalanta*, L., *P. huntera*, Fab., *Vanessa antiopa*, L., *Polygonia interrogationis*, Fab., *P. comma*, Harr. (the two broods), and bred series of *Telea polyphemus*, L., and *Samia cecropia*, L. A discussion ensued as to the singularity of a species like *V. antiopa* being gregarious in the larval stage, while the imagines were seldom met with in company.

Mr. R. Adkin, examples of *Crambus ericellus*, Hb., *C. dumetellus*, Hb., *C. pratellus* L., *C. myellus*, Hb., *C. pinellus*, L., *C. furcatellus*, Zett., and *C. margaritellus*, Hb., and pointed out characters by which the closely allied species might be easily separated.

Mr. Dennis, a specimen of *Vanessa io*, L., with a small additional ocellus on each secondary, while below the central costal blotch on the primaries was a smaller dark blotch.

Mr. H. Williams, specimens of *Pieris brassicæ*, L., curiously tinted from contact with liquid ammonia.

Mr. J. Jenner Weir, on behalf of Mr. Adye, a specimen of *Plusia moneta*, taken at Christchurch in 1893, and a nearly black specimen of *Venilia macularia*, L., from the New Forest. Also, on behalf of himself, *Eucheira socialis*, Westw., perhaps the most archaic form of the Pierine sub-family extant, and contributed notes.

Mr. Frohawk, a bred series of *Argynnis euphrosyne*, L., which were nearly eleven months in the larval stage.

Mr. Billups, on behalf of Mr. Sauzé, a large number of Diptera, captured in 1893.

Mr. Manger, an example of a Land Crab (*Ocypoda cursor*) from Lagos, which was so nimble as only to be obtained by shooting it.

Mr. Carrington, the side blown eggs of a snail (*Bulimus oblongus*), from Trinidad, which were so exceedingly calcareous as to be easily mistaken for the eggs of a bird.

22nd February, 1894.—E. Step, Esq., President, in the chair.

Mr. South, for Mr. Rose, of Barnsley, exhibited a long bred series of *Phigalia pedaria* Fb., some being uniformly black without a trace of markings; for Mr. Fowler, of Ringwood, a variety of *Euchelia jacobææ*, L., having the costal stripe carried round the hind margin to meet the spot; for Mr. Dennis, of York, photographs of very long series of *Spilosoma lubricepeda*, Esp., ranging from very pale and almost spotless to very deep colouration, and a photograph of three other varieties from the Allis collection, of York, of which two were undoubtedly of the *Zatima* form, although not extremes; for himself, a specimen of *Argynnis aglaia*, L., from Hampshire, which was a modification of var. *charlotta*, Sow., the silvery spots forming long streaks, and several varieties of *Argynnis euphrosyne*, L.

Mr. Frohawk, coloured drawings representing the complete life history of both *A. aglaia*, L., and *A. adippe*, L., with details enlarged to show the remarkable larval structure.

Mr. Warne, an asymmetrical specimen of *Abraxas grossulariata*, L.

Mr. Moore, several cases of all orders, containing specimens collected on a bicycle tour from Dieppe through Paris, Cote d'Or, and Jura to Geneva, and in Guienne, and contributed notes.

Mr. Pearce, series of *Feniseca tarquinius*, Fab., spring and summer broods of *Lycæna pseudargiolus*, Bd., *L. comyntas*, Godt., and *Thecla Edwardsii*, Saund., from Pennsylvania, U.S.A.

Mr. Auld, for Mr. Tugwell, to correct an error in the report of January 11th, series of the York city form of *Spilosoma lubricepeda*, Esp., for which he suggests the name var. *Eboraci*, series of var. *Zatima*, Cr., and series of the selected brood originating from

Yorkshire, for which he suggests the name var. *fasciata.* A discussion ensued as to variation produced by artificial selection.

Mr. Carrington, a shell of *Helix pomatia*, L., which he had cut to show the spiral and the smooth internal deposit, which latter he stated was siliceous.

Mr. Jenner Weir, a new Euplæine butterfly from North Eastern Borneo, which he had described under the name of *Caduga crowleyi.*

Mr. Lewcock sent for exhibition a box of Coleoptera to illustrate a paper he communicated, describing his observations during the various excursions of the Society.

Mr. Mansbridge communicated a paper containing his observations in the United States, entitled "Notes from the Indian Territory."

Remarks were made on the increase of Melanism in insects, and a discussion ensued.—Hy. J. Turner (Hon. Report Sec.).

LANCASHIRE AND CHESHIRE ENTOMOLOGICAL SOCIETY.

February 12, the President (Mr. S. J. Capper, F.L.S., F.E.S.) in the chair. Miss E. H. Lea, Kirby Park, West Kirby, and Mr. Frederick Rose, 64, Mount Pleasant, Liverpool, were elected ordinary members of the society. Mr. Robert Newstead, F.E.S., read a paper entitled, "Correlations of Plants and Insects," in which he discussed the fertilization of the Yucca, and explained the process as described by Prof. C. V. Riley in "Insect Life," and added some notes from his own observation on the insects frequenting the flowers in this country. He also gave notes on the gall-making Brachyscelidæ of Australia, a group of coccidæ peculiar to that country. He also called attention to the galls of *Diplosis rumicis* (Linn.), and suggested that it is quite possible botanists have described malformed "tubercles" of some species of Runex, as he had found a great number of "tubercles" abnormally swollen by this species. The paper was illustrated by diagrams and specimens, including a specimen of gall-making coccidæ from Australia. The president exhibited a yellow variety of the variety confluens of *Zygæna trifolii*, taken by Mr. W. M. Christie in West Sussex, Mr. Gregson a specimen of *Arctia caja*, with dark nervures, Mr. H. B. Jones a number of Scotch lepidoptera, Mr. Stott *Calosoma inquisitor* L., *Gestrupes typhœus* L., and *G. vernalis* L.—F. N. Pierce, Hon. Sec., 7, The Elms, Dingle, Liverpool.

MANCHESTER MICROSCOPICAL SOCIETY.

The ordinary meeting of the Manchester Microscopical Society was held at the Grand Hotel on Thursday, the 22nd February, the new president, Professor Weiss, B.Sc., F.L.S., F.R.M.S., in the chair. A testimonial, consisting of an illuminated address and a number of standard works, was presented to Mr. James Hart, F.C.S., in recognition of the services he has rendered to the society as honorary secretary for over four years. A committee was formed for the purpose of obtaining subscriptions for a memorial of the late Professor Marshall, who was the president of the society for the seven years 1887-1893.

The President gave a lecture on "Recent Researches and Speculations on the Structure of Protoplasm." The lecturer traced the recent advances in the knowledge of the minute structure of protoplasm. The minute or microscopical structure of protoplasm has been a more recent field of research than almost any biological investigation. The older researches do not date back to much before 1880, and all those considered were of a later date. The granular theory put forward by Hanstein in 1882 has received an impulse by more recent investigations of Altman and Saftigen, who observed those granules actively dividing in some cases, and compared them with micrococci and bacteroids, and suggested some homologies. The fibrillar theories put forward by Flemming, Camillo, Schneider, and Fayod have now more of an historical interest, and do not agree with the most recent observations. The reticular theory of Pflüger and others still fulfils that condition, at least, for even with the highest magnifying powers protoplasm appears as a fine network, the granules of older observers being largely represented by the corners of the meshes. The lecturer then gave an account of the way in which Professor Bütschli approached the problem from the chemico-physical side, and the observations which led that observer to propound the view that protoplasm was built up of innumerable microscopic vesicles, and had therefore a foam-like structure. The appearance of protoplasm under the microscope supported this theory, and the foam-like substances prepared by Bütschli had not only the appearance of protoplasm; but exhibited many phenomena, such as amœboid movement, which were considered formerly as attributes of living matter, but were now explained as physical phenomena. The lecturer showed how the application of this vesicular theory of protoplasm helped to explain many puzzling phenomena occurring in vegetable cells, and accepted it provisionally as the most workable of the theories propounded. In the light of this new theory the older views and newer with regard to heredity were discussed, and the theories of Darwin, Naegeli, Weismann, De Vries, and Wiesner were touched upon, the lecturer adopting the view that the ultimate particles of so highly-organized a substance need not all be similar, as is assumed, for the "plasomes" of Wiesner were probably different in nature or capable of rapid change, and therefore of differentiation.

A vote of thanks to Professor Weiss, proposed by Mr. W. Blackburn, F.R.M.S., seconded by Mr. M. L. Sykes, F.R.M.S., and carried with acclamation, concluded a most successful and enjoyable meeting.

MICROSCOPY.

Collecting Diatoms.—Bright brown patches of diatoms, frequently seen coating the surface of mud, may be collected in the following manner. Half fill a bottle with water, touch one of the brown patches with the tip of the finger, and the diatoms will adhere; place the tip of the finger to which the diatoms are adhering over the mouth of the bottle, shake it, and the diatoms will be washed off. By frequently repeating this process, the water will become quite brown, and by the time the collector reaches home, the diatoms will have settled to the bottom; the water may now be decanted, and the diatoms cleaned. The collector is recommended to examine every promising patch of brown under a lens, for very fine pure gatherings of quite different species may not unfrequently be gathered within a few feet of each other.

Mounting Fresh Water Algæ.—The following is the method of mounting fresh water algæ in glycerine or glycerine-gelatin, adopted by Dr. L. Klein. Glycerine he uses for small objects, adopting for this purpose the *technique* proposed by Migula. A drop of one per cent. of osmic acid is run under the cover glass, followed by the glycerine in ten to twenty minutes afterwards. In order not to blacken the oil drops, &c., the osmic acid is added in as small quantities as possible; the best method being to blow it under the cover glass through a capillary tube.

In all other cases Dr. Klein uses glycerine-gelatin, which is, under proper precautions, an excellent embedding material. The object is first hardened by exposing it as a hanging drop to the fumes of the acid for a few minutes. It is then placed in one or two drops of dilute glycerine, and the surplus having been drained off, or the water evaporated, a drop of glycerine-gelatin, previously heated in a test tube, is dropped on by means of a fine glass tube. By this device air-bubbles are avoided. Some objects may be fixed by heating them on the slide up to nearly boiling point, in place of using osmic acid.

LEPIDOPTERA.

What Constitutes a British Insect?—Whilst inquiring "What constitutes a British insect at the present time" (*British Naturalist*, New Series, page 1,) Mr. C. S. Gregson mentions having recently seen specimens of *Polia Xanthamista* (Hb.), said to have been bred from a female *P. Nigrocincta*, captured in the Isle of Man. One of my most intimate friends whom I had induced to accompany me to the Island for a few nights, "*Nigrocincta* larvæ hunting," on the rock-bound coast (we having had a most unsuccessful journey), informed me later on that he had the perfect moth offered for sale at one shilling each by a dealer in insects, who said his specimens were bred from ova deposited by a female taken in the Isle of Man. I said "Nonsense! Isle of Man specimens of *Polia Nigrocincta* are worth to an honest dealer in British insects many times that sum each, and you having spent night after night in fruitless search for it ought to know that!" But behold the next time he visited me he brought a rather long series of specimens *not like Manx P. Nigrocincta*! which he had bought from his friend the dealer on a guarantee which I have seen, that "they were bred from ova deposited by a female *P. Nigrocincta* captured in the Isle of Man!" I merely observed, "This guarantee is hardly likely to make me, who know the Manx form so well, think your purchase Manxmen. My good friend left after comparing his guaranteed *specimens* with my cabinet specimens, bred by myself from larvæ personally gathered (by the light of a lantern) along the rocky coast around Onchan, Douglas, Isle of Man. Since then several correspondents have offered *P. Nigrocincta* to me in exchange, presumably these 1s. so-called Manxmen, little knowing that I have been accustomed to visit the Isle of Man several times each year expressly to collect its larvæ, and as I have bred a few *P. Nigrocincta* annually for more than 20 years I think I know the Manx form so well that I cannot be deceived. But I have not answered Mr. Gregson's question "What constitutes an insect *British* at the present time?" I do not think that these so-called descendants of a dealer's specimen, said to have been captured in the Isle of Man, can be looked upon as British by anyone who knows what Isle of Man *P. Nigrocincta* are like. In any case I should not put one of these *Xanthamista* (Hb.)-like specimens in my British collection as a British insect without better proof than I possess at present.—JOHN THORPE, Middleton, near Manchester.

ACIPTILIA SPILODACTYLA, CURT.—Mr. Tutt in the January number of the *British Naturalist*, page 8, stated "I have left entirely out of account the Fabrician migadactyla, as there may be a white Continental (not British) species, to which the description might apply, but that does not influence Haworth's use of the name for our species;" and again "I have already quoted Haworth's original description of migadactyla." These audacious statements rather startled me, so I consulted Chambers's Dictionary as to the meaning of the word original, and find it to be "first in order of existence, not copied, not translated." Then I turn to Haworth's "Lepidoptera Britannica," and find in it Pterophorus migadactylus, Fab., Ent., Syst., with full description taken from Fabricius and acknowledged. Then I turn to Fabricius' work, and find his description to be word for word the same as Haworth's. Yet Mr. Tutt would have us believe that Haworth himself described this species and that his name ought to stand. But the migadactylus of Fabricius and of Haworth is the same species, and the descriptions are identical. Whether Haworth intended or not the name and description to apply to the species, which Curtis afterwards named spilodactyla, has nothing to do with it. The fact remains "he did not name and describe a species as migadactylus, but merely copied Fabricius; and moreover he did not possess spilodactylus, Curt." Mr. Tutt will find a figure of the species under the name Migadactylus in Wood's "Index Entomologicus" (probably ochrodactylus, Hb).—C. W. DALE, Glanvilles Wootton, February 8th, 1894.

ORNITHOLOGY.

THE HAWFINCH, OR HAW GROSBEAK (Coccothraustes vulgaris).—It is not, I am well aware, within the scope of your Magazine to sing the praises of the Morello cherry, though it well deserves a eulogy. Some years ago a single tree continued year after year to bear so well that I planted a number of trees, not only against north and west walls, but in the open, in my orchard amongst the apple, pear, and plum trees. The soil is thin and very light, never forming clods, and below lies 20 feet of soft yellow sand, similar to the deep bed exposed by the Ship Canal cutting at Twenty-Step Bridge, and a heavy crop, lasting from about the 10th August to the middle of September, has always rewarded me. The neighbourhood might be a Morello cherry supply for all England, if people only studied what will grow and what will not, and it is a fruit which always commands a high price. One of the large fruit growers of Covent Garden told me that he should only be too glad to take 20 tons, or more, if he could get them. Pardon this preface, and let me get to the hawfinch. Two years ago, a few unknown birds were observed perching on my garden hurdles at Birch Dale, within a mile and a half of Warrington, and one day I found upon my lawn the head and tail of one which had probably fallen a victim to a cat—a large bullfinch kind of head, and a black, white, and greyish brown tail. Shortly afterwards another was caught in a cherry net, and was kept for some weeks in a cage, where it fed greedily upon hempseed. A third specimen was killed, when entangled in the net, by a dog, and a fourth specimen was released and turned loose. One or two young birds again paid us a visit last year, and one was killed at Thelwall. So far as is known, no old birds were seen, nor was a strange note heard, but according to Yarrell's "British Birds," vol. i., p. 483 (edition of 1843), the Hawfinch is a bird of shy and silent habits. When the leaves fell, a large nest composed of long dry stalks of rye-grass twisted round and round, similar in shape to the nest given in Yarrell's illustration (p. 489), was found in the fork of a horse-chestnut above the hurdles where the young ones were first seen. There was no lining to the nest when found, nor was there any lichen, but it would have been impossible to find any lichen in so populous a neighbourhood. The rye-grass was cut at the end, and had evidently been taken from a cut crop of clover and rye-grass. Yarrell mentions a nest found in a similar position in a horse-chestnut, so there would seem to be little doubt that the nest belonged to the bird. It certainly was not a sparrow's nest, of which there are too many about Birch Dale. Whether the Morello cherry or some very long rows of peas were the attraction I cannot tell, but the visit of such birds to this neighbourhood is well worthy of a passing record.—ROBERT DAVIES, Birch Dale, Warrington.

NOTES.

DENTISTRY AMONGST THE AZTECS.—While in Boston recently, I took the opportunity of visiting Harvard to look through the Museum. Rambling about, I was fortunate enough to make the acquaintance of Mr. Goodale, the Professor of Botany at the University, who on learning that I was "a Britisher," very kindly undertook to act as guide. Amongst the many interesting exhibits, one is, I think, unique.

A skeleton of one of the mysterious race of people known as the Aztecs was recently discovered containing a full set of teeth. The left front upper incisor is remarkable as in the centre is fixed a small round piece of jade. Whether this was the artificial stopping of a decayed tooth or put in as an ornament it is difficult to say, but seeing that all the other teeth are sound, the probability is that it is merely for ornament. To-day the Chinese think it lucky to wear the same stone, and nearly every woman carries a piece in her hair, while many of the men wear it in the form of a bracelet. Possibly the Aztecs may have had the same superstition. I said all the other teeth were sound, but careful examination reveals the fact that the right *front upper incisor is a false tooth.* It is of quite a different material to a natural tooth, but so good an imitation that the difference was not noticed until some time after the skeleton was deposited in the Museum. After the man's own tooth had been drawn it may have been utilized as a model for the new one, and this afterwards pushed up into the jaw. False teeth and the science of dentistry are usually supposed to be an invention of modern times, but here is evidence of dentistry being practised some hundreds of years ago, by a race of people who are not generally thought to have advanced to such a state of civilization, as this recent discovery would seem to show.—F. W. MONKS, Brooklands, Warrington.

◆

BOOKS, &c., RECEIVED.

"*Irish Naturalist.*"
"*The Naturalist.*"
"*Transactions of the City of London Entomological and Natural History Society,* 1893."
"*Science Gossip.*"

TO CORRESPONDENTS.

Subscriptions, Exchanges, Correspondence, Notes, Papers for Publication, and all other communications must be addressed to the Editors "British Naturalist," Warrington.

All Exchanges, Queries, &c., for insertion in the following number, must reach us not later than the end of the previous month. All Queries must bear the writer's name.

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Correspondents will please note and write on one side of the paper only.

ARACHNIDA.—*The Rev. Fredk. O. Pickard-Cambridge, High Street, Swanage, will name and return any collections of British Spiders received from correspondents of the "British Naturalist," provided that several tubes be sent for their reception. He would also be glad to send types of British genera in return for any specimens he might wish to retain. The specimens* need not *be separated into tubes before sending, but a label, ready addressed and stamped, should always be enclosed. If the specimens are placed in separate numbered tubes, a paper, also numbered, should be sent for the reception of the names.*

ACARINA.—*Mr. C. F. George, Belle Vue House, Kirton-in-Lindsey, will name any specimens of Acarina sent to him for that purpose.*

DIPTERA.—*The author of "British Flies" (Diptera), Fred. V. Theobald, M.A., F.E.S.,* 12, *Trumpington Street, Cambridge, will name specimens of Diptera sent to him for this purpose. He will also advise on the subject of injurious insects.*

CONCHOLOGY.—*(Land, Freshwater.) Mr. C. O. Pickard-Cambridge, Balliol College, Oxford, will name shells sent for identification. Applicants must keep duplicates of specimens sent.*

BRITISH ODONATA (DRAGON FLIES), AND BRITISH ORTHOPTERA.—*Mr. W. Harcourt, Bath,* 195, *Ladywood Road, Birmingham, will name specimens and answer questions referring to above orders.*

LEPIDOPTERA.—*Mr. Eustace R. Banks, M.A., F.E.S., The Rectory, Corfe Castle, Wareham, will name specimens of Lepidoptera sent to him for that purpose. Applicants must, however, retain duplicates.*

Stamped envelope must accompany all applications.

EXCHANGE.

EXOTIC SCOLYTIDÆ.—Having acquired the celebrated collection of Bark Beetles, *Scolytides*, the largest in the world, of the monographer, Dr. Eichoff, I wish to obtain, by purchase or otherwise, all exotic *Scolytidæ* not classified, coming with original sendings.—DIRECTOR CAMILLO, F. SCHAUFASS, Miessen, Saxony.

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DUPLICATES.—Corynetes rufipes. C. ruficollis, Nitidula bipustulata. Habrocerus capillaricornis, Ocypus ater, Rhyncolus cylindrirostris, Aphodius fætens, A. nitidulus, Bembidium ephippium, Dermestes undulatus, Anthicus instabilis, Thyamis distinguenda. Lithochara brunnea, Amara convexiuscula, Hopatrum sabulosum, and nearly 500 others. *Desiderata.*—numerous.—A. FORD, Glen Mont, Braybrooke-road, Hastings.

DUPLICATES.—Filigramaria, Zonaria, Chi, Ulmata, Didymata, Glauca, Festucæ. *Desiderata.*—Numerous local series.—J. W. BALDWIN, 472, Darwen-road, Dunscar, Nr. Bolton.

Duplicates.—Edusa, Corydon, Adonis, Tipuliformis, Hirtaria, Citraria, Rupicapraria (♀). Defoliaria (♀), Vulgata (bred, dark London forms), Assimilata, Bipunctaria, Pallens, Lithargyria, testacea, furuncula, literosa, blanda, puta, suffusa, nigricans, N. rubi, c-nigrum, peria, capsincola (a few, bred), libatrix. Pupæ of alchemillata. Desiderata—very numerous; especially obfuscata, simulata, trepidaria, tristata, albicillata, fumata, salicata.—Louis B. Prout, 12, Greenwood Road, Dalston, N.E.

Duplicates.—Lubricipeda var. (York forms), Sylvata, Immutata, Aurantiaria,* Boreata,* Albipunctata and var. Angelicata,* Valerianata,* Absinthiata,* Tenuiata,* Sparsata,* Gemina, Arcuosa, Suspecta, Cerago,* Silago,* Cucubali,* Viminalis,* Herbida,* Thalassina. *Desiderata.*—Numerous.—G. Jackson, Nunnery Lane, York.

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City of London Entomological and Natural History Society.—Books lost in the fire at St. Mary Axe.—Will those gentlemen to whom I have not replied kindly take this as an intimation that all the volumes are now replaced?—G. A. Lewcock, 73, Oxford-road, Canonbury, N.

Wanted, Rye's "British Beetles."—Address "Agriotis," c/o Editors, *British Naturalist*, Warrington.

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Evolution of Sense Organs. HY. LANGDALE, M.D.

Some Curious Aquatic Larvæ. GEO. SWAINSON, F.L.S.

Geology and Scenery of Killarney. CHAS. WHITE, Esq.

Sexual Distinction of Insects. C. W. DALE, F.E.S.

An Entomological Trip to the Canary Islands. MOREL-DEVILLE.

Extracts from "Sylva Sylvarum." A. E. HALL.

Sugaring Notes.

Recent Investigations in the Currant Bud Mite—*Phylophus ribis.* A. NEWSTEAD, F.E

Habits of Larva and Parasites on Orthosia Upsilon. J. COLLINS.

The Band-Variation of *Helix nemoralis,* and *H. hortensis* in the British Islanc
T. D. A. COCKERELL, F.Z.S.

Bibliography of British Spiders. Rev. F. O. PICKARD-CAMBRIDGE.

List of Irish Coleoptera. Rev. W. F. JOHNSON, F.E.S.

Rhopalocera of the Isle of Man. H. SHORTRIDGE CLARKE, Esq.

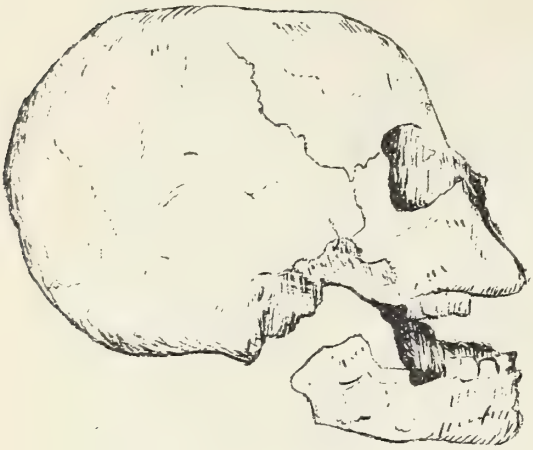
Synonymic List of British Spiders. Rev. F. O. PICKARD-CAMBRIDGE.

Water. E. BOWDEN, M.R.C.S.

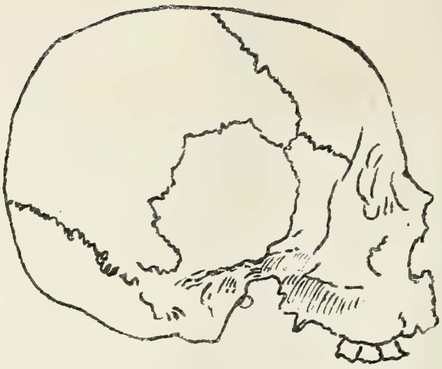
BRITISH MUSEUM
NATURAL HISTORY.

PLATE IV.

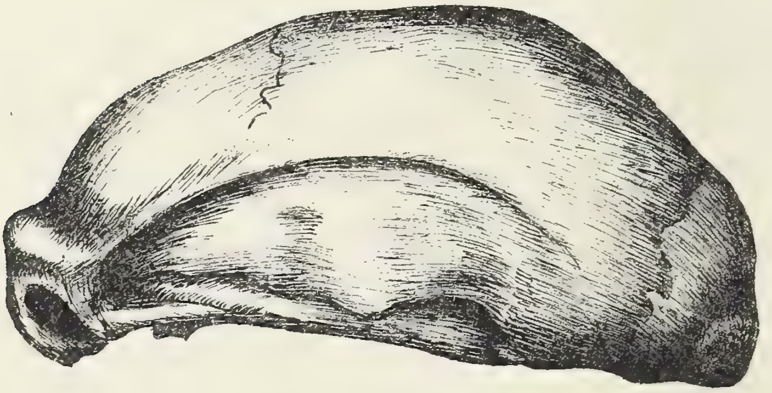
TROU DE FRONTAL SKULL.



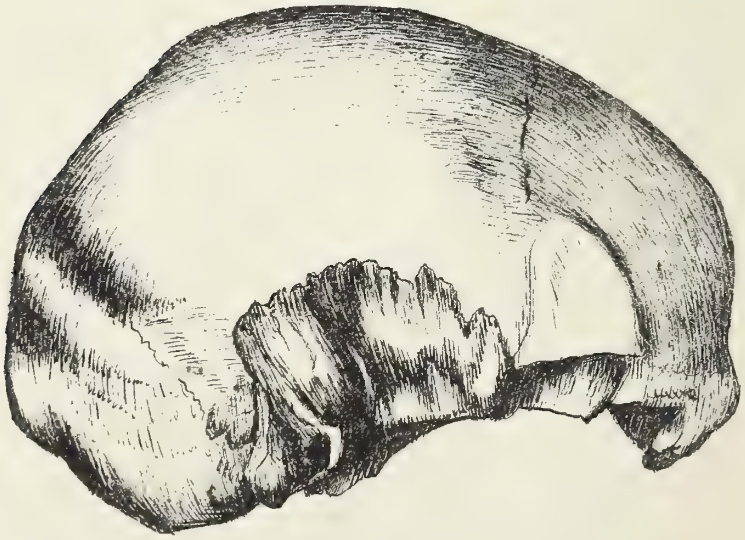
RHÆTIAN SKULL.



NEANDERTHAL SKULL (profile)



ENGIS SKULL (profile)



PREHISTORIC SKULLS.

THE
BRITISH NATURALIST.

NEW SERIES.

NOTES ON EARLY MAN: THE PLIOCENE PERIOD.

BY JOSEPH SMITH, F.R.S.A., M.R.I.A.

To what period in the great geological scale can we attribute the first appearance of man on the globe is a consideration which has engaged the attention, not only of geologists, but of all those who find themselves interested in the progressiveness of the human species. It is only from the interest the question has excited, and the attention it has of late years centred on itself, that any advance has been made in our knowledge thereon, but sufficient evidence has now accumulated to enable, in a certain degree, a satisfactory solution of this great and highly interesting social problem.

When pursuing our inquiries it is impossible not to recognize the valued assistance our Continental *confrères*, by their independent researches, have brought to the evidence bearing on Early Man, and it is rather through remains which have been unearthed from the great caves and other localities in France, and the care with which the various items of information have been stored, than otherwise, that to-day we are able to throw any light on the great and ever-engaging question, the "appearance of Early Man."

So far back as the year 1864 Garigou considered he had in certain excavations unearthed sufficient proof, to establish the co-existence of man with the mammalia of the Miocene age—the second division of the Tertiary formation,—an age with which, in order to support the theories of some enthusiastic anthropologists, traces of man are first supposed to be identified. This proof of Garigou's was the discovery of some fragmentary bones belonging principally to the *Dicrocerus elegans*, which were split up similarly to those bones found in the quaternary caverns of the hill of Sausan, in Gers. Four years afterwards—that was in 1868—when these bones were submitted for examination, the idea of their being in any way evidence in support of a co-existence of man with the Miocene mammalia was negatived, as also were the markings or scratchings pointed out by Colonel Laussedat on the jawbone of a rhinoceros, which had been exhumed from the Miocene beds of Billy. Delaunay, however, produced the ribs of a Haliterium, which he had obtained from the shell marls of Pouancé, in the Maine-et-Loire, on which certain markings could be distinguished, by geologists considered as valuable evidence, and which for a long time had the credit of being the handiwork of man. During the year 1873, the Abbé Bourgeois, who had previously endorsed this opinion, now came to the conclusion that the markings in question *had not* been made by man ; and Hébert, who had undertaken a painstaking examination of the remains and the markings on them, announced as his opinion that they had been produced when the bones were in a fresh state by the *Carchorodon megalodon*. All these "finds" are preserved in the Museum at St. Germaine, and on first view the various features connected with them are apparently produced by the human hand. In addition to these remains, the only objects belonging to the Miocene period bearing any weight on the question are the worked flints of Thenay, in the Loir-et-Cher. These were found deep down below a recent bed containing polished flints, which rested on a quaternary layer embedding flints of the St. Acheul type, and also topped several tertiary strata containing numerous remains of the great mammalia, the Haliterium, Mastodon, Acerotherium.

The flints consisted of small scrapers, piercers, small arrow-heads, &c., all of which were so rudely shaped that for a long time they were regarded as objects which had acquired their shape by chance, and without the intervention of any intellectual power. For four long years the question of the *shaping* of the flints being produced by an intellectual being, was one which excited no small amount of curiosity and interest in various scientific circles, when in 1873 Bourgeois produced a further number of flints for inspection, whereof the scrapers called for marked attention, since several of them not only showed traces of the action of fire, but they of themselves were sufficient evidence that fire had been requisitioned for the purpose of giving them their form.

It is during the Tertiary period the first traces of mammalia are met with. Apparently, it was not until towards the middle of that period the mammalia attained their full development, although remains have been found so remote as the Eocene period.

Very little can, however, be ascertained as to what the qualities possessed by the manufacturer or shaper of the Thenay flints were, and we are unable to form an accurate estimate of that *being* which wandered abroad during this early period. "Tertiary man," says the learned Quatrefages in his "Human Species," "is known to us only from the faint traces of his industry. Of himself, however, we know little or nothing."

Portions of skeletons have at different times been discovered in France, Switzerland, and especially Italy, and these are supposed by anthropologists to belong to early man, but this supposition, however, has nothing tangible in favour of a Tertiary man. Häckel, a great anatomist, based his theory on anatomical comparison of remains found so remote as the middle Eocene, and some enthusiasts ground their arguments on a comparative examination of the remains of a species of fossil ape—*Mesopithecus Pentelici*—which have been found somewhat numerously in the deposits belonging to the latter portion of the Miocene age.

There does not, however, appear to be any special interest attached to the flints from Thenay, for on first inspection they look as though split by the aid of fire and accidental flaking. Gaudry, who is an authority on matters relating to early man, when treating on the Tertiary mammalia, considers the Thenay flints to be nothing more than the stones which were used by the *Dryopithecus*, and which had been so broken for convenient handling. This theory of Gaudry's is more fully treated on in his work, "Links in the Animal Creation during Geological Times," wherein he produces much which is interesting and worthy of consideration, and which must be materially weighed before assuming any final position as regards the existence or otherwise of our Tertiary ancestors.

Now, there is no evidence which is available against the theory that these flints were the production of the *Dryopithecus*, but although this precursor of man is considered to be a great anthropomorphous ape, it is on the examination only of a very few remains the assertion is grounded, and since from experience it has been shown that during the quaternary period evidences of the human race were discovered, which showed very simian characteristics, so also may these scant remains, which for more convincing evidence have been considered as apish, have belonged to a being of almost equal intelligence to ourselves. It must not be forgotten that this theory of an anthropomorphous ape finds itself solely established on the examination of very scant remains which have as much in their favour of having belonged to a human being as to an ape. It cannot be disputed, even in this nineteenth century of intellectual civilization, that we meet with fellow-beings whose anatomical proportions are very simian, and could their remains be discovered under similar conditions as those referred to the *Dryopithecus*, they would furnish the scientific world with food for many earnest and warm discussions. Now, some of the bones of this *Dryopithecus* have been unearthed by Fontan at St. Gaudens, and have been described by Lartet. Unfortunately, nothing is left to build up our ancestral precursor on save a jawbone and a humerus. Of these Gaudry made a crital examination, and was forced to the conclusion that they resembled the remains of man in many points; firstly as regards upright stature, which is a characteristic of the greatest importance ; secondly in the incisor teeth, and also the sufficiently rounded faces of the back molars, which are similar to those of Australian tribes.

(To be continued.)

GOSSIPING NOTES ON BRITISH COLEOPTERA.

BY G. A. LEWCOCK.

(Continued from page 49.)

Licinus, Latreille.—A Roman proper name. But two species figure in the British list, viz., *silphoides* and *depressus*. Both are local, and by no means common.

L. silphoides, F.—Interstices of elytra coarsely and rugosely punctured. I received my specimens from the late Dr. Horner, who captured them at Folkestone. Mr. R. Beck (Southampton) took two on the top of Portland Head, September 3rd, 1890. Mr. C. W. Dale records it from Lulworth, Portland. Also taken by the late Rev. H. J. Gore and Mr. West (Greenwich) under stones at bottom of Box Hill. Mr. G. C. Champion ("Kent and Surrey Coleoptera"): "Chalky hill sides and sandy coasts, at roots of grass, under stones, sometimes beneath seaweed; rather common ; Cuxton, Folkestone, Chatham, Sheerness, Hythe (Kent); Boxhill, Reigate, Caterham, Gomshall (Surrey)." Dover and Deal, not common (G. C. Hall). Weymouth (R. Gillo). Not recorded from Ireland (Rev. W. F. Johnson).

L. depressus, Payk. — Rather smaller than *silphoides*, and with interstices of elytra finely punctured. I received my specimens from Mr. J. E. Robson, who took them at Hartlepool. It has been taken at Box Hill by Mr. W. C. Chaney and the late Rev. H. J. Gore ; at Betchworth by Mr. West ; under lumps of chalk on the coast at Kingsdown and Folkestone by Mr. Newbery. Mr. G. C. Champion (" Kent and Surrey Coleoptera ") : " Chalky places, under stones, at roots of grass, &c. ; not uncommon ; Dover, Folkestone, Canterbury (Kent) ; Boxhill, Gomshall, Caterham, Sanderstead (Surrey)." Not represented in Ireland (Rev. W. F. Johnson).

Badister, Clairv.—From Greek Βαδιστὴς, a runner ; doubtless in allusion to the activity of the genus. Of the four species regarded as British, only *B. bipustulatus* can be called common. Two species have the thorax red, viz. *unipustulatus* and *bipustulatus*. The other two have the thorax entirely black or with a yellow margin.

B. unipustulatus, Bon.—Distinguished from *bipustulatus* in having the mesothoracic episterna red instead of black ; also slightly larger in size. Recorded from Oxford by Mr Shipp. The only other reliable record I have is by Mr. Champion (" Kent and Surrey Coleoptera ") : " Marshy places, at roots of grass, &c. ; uncommon ; Lewisham (Kent) ; Merton, Walton-on-Thames, Putney, Battersea, Egham (Surrey)."

B. bipustulatus, F.—Generally considered a rather smaller species than *unipustulatus*, but the thorax is larger, and very slightly narrowed behind. The beetle can be taken in damp and marshy places, in flood refuse, and behind willow bark, and is fairly common in most parts of the British Isles. Recorded by all correspondents. The Rev. W. F. Johnson reports it as occurring " from Antrim to Cork, and from Down to Galway."

B. sodalis, Duft. — In this species both thorax and elytra have yellowish margins. The insect is not common. Dr. Capron has taken it under stones at Sheire, near Guildford ; it is also recorded by Mr. C. W. Dale, from Granvilles Wootton. The late Mr. R. Gillo took single specimens under stones about Bath and at Burnham. Mr. Champion (" Kent and Surrey Coleoptera ") : " In chalky districts, under moss and dead leaves ; occurs also in marshy places ; not uncommon ; Darenth Wood, Kent ; Mickleham, Egham, Redhill, Walton, Reigate, Sanderstead, Battersea (Surrey)." Ireland : Recorded by Halliday from near Belfast (Rev. W. F. Johnson).

B. peltatus, Panz.—The difference between this species and *sodalis* appears to be so slight that I can scarcely find a reliable character. The margins of both thorax and elytra at the extreme edge are sometimes brownish or yellowish, otherwise the black thorax might be a sufficient distinction. The legs are dusky testaceous, whereas in *sodalis* they are pale yellow, and the insect is generally broader. Mr. Champion records it as rare at Hythe (Kent). The Rev. H. J. Gore captured it at Ruspar.

Broscus, Panzer.—Greek βρώσκω, devour. The Rev. W. F. Johnson, who has kindly supplied me with notes on this derivation, says " *Broscus* appears to be a corruption of the Latin *brochus*, meaning projecting, and applied to the teeth of animals, and is very applicable to the projecting mandibles of this beetle; *Cephalotes* Greek (κέφαλος) referring to its large head." Our single species *B. cephalotes*, L., is found principally on the sea coast, and is a tolerably evil-smelling insect; probably few persons would care to handle it a second time. Mr. W. E. Sharp (Ledsham) records it as "common all round our shores in Lancashire, Cheshire, and North Wales, lurking under pieces of loose wood, seaweed, &c." Mr. Champion ("Kent and Surrey Coleoptera"): "Sandy coast and banks of rivers; abundant on the coast, rare inland; Sheerness, Deal, Folkestone, Whitstable (Kent); one at Walton-on-Thames, Surrey." Mr. R. Gillo: "A very common species under marine rejectamenta at Burnham, and the most interesting example of feigning death that I have ever seen." Mr. Keys: "Under stones on the shore, and at roots of plants, Plymouth." The Rev. W. F. Johnson: "*Broscus* seems pretty fairly distributed in Ireland; I have records from Antrim, Donegal, Louth, Dublin, Wicklow, and Waterford. I found it very plentiful last summer (1893) on the Donegal coast." Mr. H. G. Cuthbert: "Very common on all the shores; I have met with it in Down, Louth, Dublin, &c."

MISCODERA, Eschscholtz.—Derived from two Greek words, μίχος, stalk, δηρὸς, long; evidently in allusion to the peduncle joining the thorax and abdomen. *Arctica* (ἀρκτικὸς), northern, refers to the habitat. Our species, *M. arctica*, Payk., resembles Dyschirius in general appearance, but of course is very much larger. It is extremely local. I received my specimens from Mr. Reston and Mr. W. E. Sharp. The latter records it from "Llangollen moors, common in June, but at the same time very local." Also taken by Mr. R. Wilding at same locality. No other reports have reached me, but the late Mr. R. Gillo received his specimens from Bradford, Yorkshire; this record I am unable to verify.

SPHODRUS, Clairville.—I have nothing further to add to the account given in *British Naturalist*, vol. i., page 197.

PRISTONYCHUS, Dejean.—Derived from two words meaning serrated, or toothed claw; probably in allusion to the generic character. Our British species, *P. terricola*, Herbst., was formerly called *subcyaneus*, Ill. (Sharp's Catalogue, 1871, and Fowler and Matthew's Catalogue, 1883). The beetle is well known as a frequenter of cellars and out-houses in London, and is very common in most parts of England and Ireland. I have found numbers in the sandpits at Esher and elsewhere, and it is reported by all correspondents. Mr. H. G. Cuthbert (Dublin) writes: "It occurs all over the country in kitchens and cellars. I have it from Ely Place, Dublin; and also have taken a large series in my cellar at Black Rock." An immature specimen was also sent me by Mr. Brown (Dublin), who found the beetle very common in Ireland.

LEPIDOPTERA IN THE NEIGHBOUHOOD OF YORK, 1893.

BY W. HEWITT.

The 1893 season, which will long be remembered meteorologically on account of the marvellous weather experienced, has not been equally memorable for quantity or quality of Lepidoptera noticed. Many generally common insects have been either very rare, or else entirely conspicuous by their absence, the only species which have been more than usually common at York are the following:—*P. brassicæ*, *P. rapæ*, *V. urticæ*, *V. atalanta*, *A. atropos*, *S. convolvuli*, *M. stellatarum*, *O suspecta*, *A. litura*, *P. meticulosa*, *H. protea*, *A. sylvata*, *V. cambricaria*, *L. lobulata*, *C. sparsata*, *L. marginata*, *T. variata*, *C. fagella*, whilst of those which have not occurred in anything like their usual numbers the following, amongst many others, may be quoted:—*Z. loniceræ*, *L. mesomella*, *A. lubricepeda*, *A. leporina*, *N. festiva*, *N. rubi*, *H. porphyrea*, *T. populeti*, *T. leucographa*, *E. vespertaria*, *A. strigilata*, *E. satyrata*, *A. immutata*, *P. lignata*, etc. Of those species which have entirely failed to put in an appearance, and which we generally take each season in some numbers, are *N. senex*, *H. unca*, *P. festucæ*, and *M. arcuosa*. My first outing took place on the 14th February, in quest of the variety *fuscata* of *H. progemmaria*, of which I took six; my last on the 3rd November, when sugar produced but a few *S. satellitia* and *C. vacinii*. *H. aurantiaria*, *H. defoliaria*, *C. boreata*, and *C. brumata* were very scarce, whilst *O. dilutata* and *H. pennaria* were not seen. I have noticed the gradual diminution in point of numbers of these species for the past ten years, each year they become scarcer in this neighbourhood: why, I know not. My worst outing produced five moths, my best 253; altogether this season I have set considerably more than 3,000 specimens.

EARLY APPEARANCES.—Owing to the almost tropical weather, instances of early appearances have been far too numerous to mention here. On the whole, species have appeared fully a fortnight earlier than usual, in many instances three weeks, and in some exceptional cases even a month, in advance of ordinary seasons.

MELANISM.—Instances of melanism in specimens captured this season have not been up to the average. A very large number of the Noctuæ and Geometræ (especially the former), which occur in the neighbourhood of York, are more or less subject to melanism. A full list of the species which show this tendency, and have come under my observation, will be given at some future date.

SALLOWS were very unproductive, being well out by the 10th of March, and doubtless on this account the generally seductive blossoms failed to attract the *Tæniocampidæ* in anything like their usual numbers, as they would not be out so soon.

Sugar.—Whilst we have had very few poor nights at sugar, the quantity has rarely been great and the quality invariably poor. The reason for this has been, in my opinion, not the counter-attraction of honey dew—at which I have noticed very few moths—but the general scarcity of Noctuæ.

Ivy-blossom.—On the 30th September I had my first night at ivy-blossom in the West wood, Beverley, where the ivy is especially abundant, clinging in wild luxuriance around the fine old hawthorn trees, which here form such a conspicuous feature of the landscape; but although the night was favourable from a meteorological point of view, the blossom fine, large, and plentiful, the odour perceptible even to human nostrils, our would-be guests failed to put in an appearance except by ones and twos—quite different to the nights at ivy-blossom one often reads about. A friend of mine, who has worked ivy on numerous occasions this season, informs me that he has had almost uniform bad luck.

Geometræ have been on the whole very scarce, and "mothing" at and after dusk uniformly unproductive. In the day-time at rest on tree trunks, palings, etc., but especially the former, *T. biundularia*, and its variety *delamerensis*, *A. cambricaria*, *A. blomeraria*, *L. lobulata*, *T. punctulata*, *A. sylvata*, *A. ulmata*, etc., have been fairly common, whilst *L. marginata*, *T. variata*, *F. piniaria*, could be obtained in abundance by means of the "beating-stick."

Scarcity of Lepidoptera.—I think this has been due in a great measure to the extraordinary abundance of their natural enemies, Ichneumons, Wasps, Dragon-flies and Bats, which together with Swifts, Nightjars, and other insectivorous birds, have, thanks to the fine weather, been enabled better to follow their work of destruction, and lastly and by no means least, to the great drought which has prevailed, these causes having also undoubtedly tended to minimize the number of larvæ, which have been unusually scarce.

The following species of Noctuæ, which are not usually double-brooded with us, have this year been either double-brooded or partially so:—*L. pallens*, *A. psi*, *A. rumicis*, *N. plecta*, *N. C-nigrum*, *A. segetum*, *A. suffusa*, *H. suasa*, *H. oleracea*.

REPORTS OF SOCIETIES.

ENTOMOLOGICAL SOCIETY OF LONDON.

February 24th, 1894.—Colonel Charles Swinhoe, M.A., F.L.S., Vice-President, in the chair. Professor August Forel, M.D., of the University of Zürich, was elected an Honorary Fellow of the Society, to fill the vacancy caused by the death of the late Professor H. A. Hagen, M D. Mr. John Pratt, of the Cedars, New Barnet, and

Mr. Michael Yeatman Woolf, of 1, Marlborough Place, St. John's Wood, N.W., were elected Fellows of the Society. Mr. G. C. Champion called attention to a supposed new Longicorn beetle, described and figured by Herr A. F. Nonfried, of Rakonitz, Bohemia, under the name of Callipogon friedländeri, in the Berl. Ent. Zeitschr, 1892, p. 22. He said that the supposed characters of the insect were due to the fact that the head had been gummed on upside down! He also exhibited an extensive collection of Coleoptera and Hemiptera-Heteroptera made by himself in the island of Corsica in May and June last. The Rev. Theodore Wood exhibited a variety of Saturnia carpini, with semi-transparent wings, a large portion of the scales being apparently absent, bred with several examples of the type-form at Baldock, Herts; also a pale variety of Smerinthus populi, which was said to have been bred, with several similar specimens, from larvæ marked with rows of red spots on both sides. Mr. R. South exhibited a variety of Argynnis aglaia, approaching the form known as var. charlotta, and a variety of Euchelia jacobææ, in which the crimson costal streak was continued along the outer margin almost to the inner margin, taken by Mr. Fowler, at Ringwood, Hants, in 1893; a variety of Argynnis euphrosyne, taken by Mr. Mead, in Epping Forest, in 1893; and a series of black and other forms of Phigalia pedaria, bred during the present year from a black female captured last spring by Mr. Rose, of Barnsley. Mr. H. Goss exhibited, for Mr. C. B. Taylor, of Jamaica, a beautifully coloured drawing of the larva of Papilio homerus, Fab. Mr. F. W. Frohawk exhibited drawings showing the complete life-history of Argynnis aglaia and A. adippe, every stage being figured; also enlarged drawings of the segments of the larvæ in their first and last stages, showing the remarkable difference in structure. Mr. Merrifield commented on the beauty of the drawings. Mr. G. C. Champion read a paper entitled "On the Tenebrionidæ collected in Australia and Tasmania by Mr. J. J. Walker, R.N., during the voyage of H.M. ship 'Penguin,' with descriptions of new genera and species"; and he exhibited the specimens comprised in the collection. Mr. J. J. Walker and Colonel Swinhoe made some remarks on the paper. Mr. Champion also read a paper entitled "An Entomological Excursion to Corsica," in which he described an expedition to the mountains of that island in May and June, 1893, in company with Mr. R. S. Standen, Mr. A. H. Jones, Colonel Yerbury, R.A., Mr. Lemann, Mr. Raine, and others. Mr. Osbert Salvin, Colonel Yerbury, and Colonel Swinhoe took part in the discussion which ensued. Mr. Edward Saunders communicated a paper entitled "A List of Hemiptera-Heteroptera collected by Mr. Champion in Corsica, with a description of one new species." Mr. W. F. Kirby read a paper entitled "Notes on Dorydium westwoodi, Buchanan White with observations on the use of the name Dorydium." Mr. Charles B. Taylor communicated a paper entitled "Description of the larva and pupa of Papilio homerus, Fab."—H. Goss, Hon. Sec.

MANCHESTER CONCHOLOGICAL SOCIETY.

MARINE SHELLS FROM THE LOYALTY ISLANDS.

The monthly meeting of the Manchester Conchological Society was held at Owens College on Thursday evening, March 8th, Mr. D. Darbyshire, president, in the chair.

Messrs. J. Cosmo Melvill and R. Standen contributed a joint paper on a collection of Marine Shells from the Loyalty Islands, made by the Rev. J. Hadfield. The Loyalty Islands, of which the three principal are Lifu, Maré, and Uvea, form part of the New Caledonian Archipelago, and are situated east of the main isle, with its capital, Noumea, being, therefore, not very far within the Tropic of Capricorn. Belonging to France, it is not surprising that several eminent naturalists of that nation have made an especial study of the fauna of this group, and many papers have appeared from their pens in the French

Journal of Conchology. The present paper is intended as a step towards the formation of a complete catalogue of the Mollusca of the New Caledonian and Loyalty Islands, and is a list of about 350 species, nine of which are considered new to science; this list being based upon a very beautiful and interesting collection, rich in individuals as well as number of species, formed by the Rev. James and Mrs. Hadfield, of Lifu. They were collected during 1892, and the species of Conus, Mitra, Cypræa, and Columbella, may be especially mentioned as being very numerous. It is nothing new to be able to pronounce these Islands as being as rich almost as the famous Philippine Islands, or Mauritius; and it is curious to observe the wide distribution of many species. Quite a number of the forms found in Mauritius are here also, some 3,000 miles or more to the eastward, although it forms part of the same vast sub-division, the Indo-Pacific Province. Some of the species in this collection have hitherto been considered of extreme rarity, but the individuals now received have proved so numerous that sets have been presented to the British Museum, where they have been welcomed as an addition to a poorly represented series in our national collection. Chief amongst these may be mentioned the lovely Mitra eximia, which has hitherto only been obtained in very limited numbers from Mauritius; Columbella tyleri, in endless variety of form and colour; Drillia regia, Latirus caledonicus, and Terebellum subulatum. In the collection are also some fine examples of Strombus thersites, Ovula tortile, Nautilus stenomphalus, Trivia childreni, and cypræa coffea. The new species described are of considerable interest, and types of each, together with a good series of all the species in the collection, have been presented to the Manchester Museum, and are now on view in the shell gallery.

Mr. Thomas Rogers exhibited a set of the exquisite glass-like shells of Opisthostoma, from Borneo, together with other foreign land shells remarkable for their rarity or beauty; and Mr. E. Collier showed a set of peculiarly banded Helix hortensis from Devizes, Wiltshire.

MANCHESTER MICROSCOPICAL SOCIETY.

A NEW LANTERN MICROSCOPE.

The usual monthly meeting of the Manchester Microscopical Society was held at the Grand Hotel, on Thursday evening, March 1st.

Mr. William Greenwood read a paper and gave a demonstration of a new form of lantern microscope (Greenwood and Wallwork's patent). After describing the arrangements of lenses of different makers, he pointed out the various improvements in the lantern which were the subject of his paper. In place of the large condensers, say from four to five inches in diameter, no lens in the new arrangement is over one-and-a-half inches diameter, and with two of the small lenses, of little value, results were demonstrated equal if not superior to those obtained when using the five-inch triple and a concave lens costing about two pounds. Another important point was that the small lenses being thinner are not so liable to damage by the heat from the lamp, which is also of novel construction. The objectives, of which in the lantern shown there were three, are mounted upon a revolving spindle which also carries the sub-stage condensers. Of these there are three, to correspond with the objectives, so that each objective has its own condenser; and after the slide is once focussed it can be instantly shown by any of the three powers of the lantern. A large number of slides were shown, to test the arrangement as regards heat damaging the slides. This was stated to be perfectly satisfactory. Ordinary cheese mites were not affected by the heat, and were shown active enough from five to six feet long, and with great clearness. The stand upon which the lantern is fixed is also new, being of metal and well finished. It is arranged with a base upon castors for moving about. The gas cylinders are arranged to stand in recesses in the base, and move about with the stand. There is a small table to carry slides, and above this a second small table that can be tilted to any angle, raised, lowered, or revolved at will, and when in position secured. To this the lantern is fixed. The lantern is so arranged that, with the same light, it can be instantly changed from the microscope lantern to the ordinary lantern without loss of time. It is the intention of the makers to produce the complete arrangement at a price within the reach of most members of the various societies.

HERTS NATURAL HISTORY SOCIETY.

At the ordinary meeting of this Society on Tuesday, March 20th, Mr. G. Rooper read a highly interesting paper on "The Salmon and Salmon Fishing." After giving a graphic description of the capture of a twenty-pounder by himself, he entered into details of the life-history of a salmon, and controverted certain statements made by Mr. Pennell in the Badminton Library volume on the same subject, one in particular relating to the use of the beak of the "kipper" during the spawning period, Mr. Rooper's opinion being that "nature has provided this singular excrescence as a protection and safeguard against the savage attacks made on each other by the kippers. . . . . As for its alleged use as a digging implement, it is nonsense. The substance of the beak is cartilaginous, not horny, and by no means hard. It would be worn down in the process of digging in ten minutes, and, as I said, the female alone prepares the 'redd.'" The duration of the "parr" stage is also a subject of dispute, Mr. Pennell stating it to be two or three, and sometimes four years. Mr. Rooper's opinion is that it occupies one year only. Again the "kelt" is described by Mr. Pennell as "unfit for food, almost poisonous." It would appear from Mr. Rooper's paper that before the passing of the Act to protect them, a good "kelt" was a very acceptable present to a gillie or labourer; and, in spite of the Act, they are still eaten stealthily by fishermen and anyone who can get possession of them, "The flesh, indeed, is soft and light-coloured, instead of being firm and red, and the flavour is very inferior, but it is not bad eating, and just as wholesome as a clean fish." Salmon literature contains many statements which must be taken with a very large pinch of salt. It is stated in many books that from the time of entering the fresh water the salmon never eats. Mr. Rooper says: "It is odd, if this is the fact, that there is no more killing bait for a salmon than a gudgeon, a parr, or a dollop of earth worms." Respecting the pace at which the salmon travels up the river, Mr. Rooper states it to be "just one mile an hour, neither more nor less." Referring to the height a fish will leap, "no salmon that ever swam jumped out of the water more than perhaps four feet. The ascent of the rapid—almost perpendicular—streams which the fish surmounts, is effected by the immense power of the tail. Give him but 'back' water to swim in, the fish would surmount an obstacle of any reasonable height, but this is effected by swimming—not jumping." It is almost needless to add that at the conclusion a very hearty vote of thanks was accorded to Mr. Rooper.

THE CARLISLE ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY,

An ordinary meeting of the Carlisle Entomological and Natural History Society was held on the 22nd March, at Tullie House, Carlisle. The President (the Rev. H. A. Macpherson) alluded in a most touching manner to the sad loss the society had sustained in the death of Mr. T. Duckworth, the vice-president, and referred to his very genial manner, and his ever willingness to assist in the promotion of the study of Natural History. A vote of condolence was passed to the family sympathizing with them in their bereavement.

Mr. Wm Blaylock exhibited the nests of the long-tailed Tit and golden-crested

Wren; and Messrs. R. Leighton and Wilkinson showed several cases illustrating the method of preserving the larvæ and pupæ of lepidoptera.

The attention of the society was called to the fact that in the local Museum Oology was not represented, and it was suggested by several of the members that this deficiency should be remedied and an oological collection formed.—Jno. Buckle, Secretary.

LANCASHIRE AND CHESHIRE ENTOMOLOGICAL SOCIETY.

March 12th, the President (Mr. S. J. Capper, F.L.S., F.E.S.) in the chair. Mr. W. E. Sharp gave a brief description of the British species of the genus Silpha, particularly those of local occurrence, in the course of which he quoted an extract from the transactions of the Société de Biologie of Paris, by Professor A. Giard, on Silpha opaca, an insect most destructive to the French beetroot crops. The notes were illustrated by specimens of the genus. Miss E. H. Lea exhibited varieties of Cidaria psitticata and C. miata; Mr. John Lea, large specimens of cidaria sagitta; Mr. John Watson, Meganostoma cæsonia, Catopsilia crocea, Colias vautierii, and C. fieldii.—F. N. Pierce, Hon. Sec.

MANCHESTER FIELD NATURALISTS' SOCIETY.

The Manchester Field Naturalists began their spring season on Saturday, March 3rd, when a party of the members visited the Whitworth Park. Of course the trees were still leafless, though green buds were shown in plenty by the early risers, among them the hawthorn, the lilacs, and the elder in particular. Here and there was abundance also of incipient sallow-bloom, though whether it would be ready for Palm Sunday seemed doubtful. Mr. Grindon spoke at length on the origin of the employment of it in church services upon that day, and adverted to the mistake, by no means uncommon, of supposing the sallow to be Rosalind's "palm," an error at once corrected by recalling the story of the sources of the play. Very pretty, too, was the spectacle of the rising foliage of many of the herbaceous perennials in the botanical department, near the Rusholme entrance, especially that of the columbine, so devoted to the collection of dew for the use of young ladies who wish to improve their complexion, light bathing of the cheeks with it, held in the palm of the hand, being an infallible specific The difficulty is that in order to be efficacious the dew must be collected personally, thrice a week from May-Day up to Michaelmas, and never a minute later than eight a.m.

The pride of the Park just now consists in its crocuses, yellow, purple, and white, a most beautiful display, diffused over a considerable expanse of greensward, near the entrance to the Art Gallery, and plainly visible to passengers along the Wilmslow road. There are no fewer than sixty-seven different species, as appears from Mr. Mann's splendid monograph, with its coloured plates of every kind. The area of geographical distribution is chiefly South European, reaching from Portugal to Greece, and having its metropolis in the last-named country and the Greek Archipelago, with extension in some degree into Asia Minor. None of the sixty-seven species extend further north than the continental shores of the English Channel. Two or three are accounted British, nevertheless, and are included in the Floras, especially the purple spring vernus, and the purple autumnal nudiflorus. The vernus once grew in abundance in meadows near St. George's, Hulme, but the ground has been covered with buildings for more than forty years. The vernus also grew in meadows below Prestwich Church. Whether still extant there he could not say. The nudiflorus is still plentiful about Northenden, near Bramall, and probably in various other places near Manchester. The meadows by the riverside below Nottingham are flooded with the vernus, and other localities are claimed. It would seem, however, that in every case of apparently British birth, the crocus is only a garden waif, or descendant of ancient cultivation, being one of the plants that love to see new countries, and wander, to that end, far and wide. The common yellow crocus of our gardens, not yet naturalized in the fields, appears to be a form of the Turkish luteus. Two or three others, notably the "cloth-of-gold," are cultivated by the curious.

Allusions to the crocus are frequent in literature, but none of those occurring before the time, probably, of Cowper and Thomson relate to our garden flower. Everything, at all events, in classical verse, in mythology, and in the history of ancient ceremonies and customs which involves mention of "crocus" is to be understood as relating not to the flower *per se* but to saffron, the dried stigmas of the Crocus sativus, the name being passed on from the drug to the plant from which it was procured. The sativus is one of the autumn-blooming species; the petals are of the same shade of purple as the nudiflorum, which at a little distance might be mistaken for the economic plant, but is at once distinguished by the crest of stigmas remaining within the flower, whereas in the sativus it hangs out in the shape of an elegant golden tassel. While, accordingly, we look with gladness at our lovely Spring display, mark how the flowers open their bosoms to the embrace of the sunshine, and close when it retires; how the bees dive into the honeyed caverns; and, alas, how remorselessly the sparrows deal with them. When we turn to the library it is quite a different story. In Oriental countries saffron has been collected from time immemorial for use as a condiment, a medicine, and a perfume. Luxury employed it in various ways for the surprise and delight of guests at entertainments, and hence it falls quite naturally into the list of odoriferous things valued by Solomon, though the Hebrew word rendered "saffron" *karkom*, may possibly also denote carthamine, the yellow colouring matter prepared from safflower, the Carthamus tinctorius, so largely used by the artists of ancient Egypt. Whether Solomon's saffron was prepared in Palestine, or conveyed thither by the famous travelling merchants so often mentioned in the Old Testament, there is no evidence to show. Most probably it was received from Persia. The allusions in classical verse to the delicate amber-yellow denoted by "crocus" are familiar; as, for example, when old Homer speaks of "crocus-robed Aurora," the eastern horizon in the latitude of the Holy Land of the Ideal presenting this colour at the time of sunrise:—

> The Cheerful Lady of the Light, decked in her crocus robe,
> Dispersed her beams through every part of this enflowered globe.

Girls, because maidenhood is the aurora of woman's existence, in ancient Greece wore saffron-coloured dresses, as alluded to in Æschylus, when Iphigenia, about to be sacrificed, smote everyone around her with the "piteous glance of her eye." Many other particulars were mentioned, in regard both to the garden flower and to saffron.

THE SOUTH LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY.

Thursday, 8th March, E. Step, Esq., President, in the chair.

Mr. R. Adkin exhibited a series of *Erebia epiphron*, Knoch var. *cassiope*, Fb., from Inverness, which were said to be of the type form (*epiphron*). He had, however, failed to detect the white pupils to the ocellated spots, which was the typical character. Mr. Weir said that the British form had no trace of the white pupil.

Mr. Routledge, specimens of a brood of *Selenia bilunaria*, Esp., which had laid over the summer of 1892, emerging in April, 1893. Also individuals bred from a pair of the latter, which had emerged at intervals from August, 1893, to February, 1894, and were all of the small form, although some had the pigment well developed. He also brought a series of *Aporophyla lutulenta*, Bork., captured in Cumberland, among which were both the var. *sedi*, Gn., and the var. *luneburgensis*, Frr.

Mr. South, exceedingly large specimens of *Ocneria dispar*, L., formerly in the possession of the late Mr. Standish.

Mr. Frobank, a third brood of *Parage megæra*, L., ten males and one female, bred by himself, from ova, deposited on August 2nd, 1893.

Mr. Billups, three species of rare Ichneumonidæ—viz., *Microgaster russatus*, Hal., taken at High Beech in 1884, *Hyperacmus crassicornis*, Gr., of which only one recorded specimen was known, taken at Oxshot in 1892; and *Euryproctus nemoralis*, Fov., taken at the same place last July.

Mr. Filer, a series of *Hybernia leucophearia*, Schiff., taken at Richmond and Epping, among which were some exceptionally dark melanic forms.

Mr. W. A. Pearce, specimens of *Attacus luna*, L., and *Citheronia regalis*, F., from Wilkinsburg, U.S.A.

Mr. Jenner Weir, male and female *Heteronympha merope*, Fab., and stated that the sexes were so totally unlike as to be deemed different species until quite recently. He also mentioned that the chrysalis was said to be contained in a frail network on the ground.

Mr. Williams, the local snake *Coronella lævis*, taken at Camberley, W. Surrey, in 1883.

Mr. Auld, on behalf of Dr. Knaggs, a working model of the Decoy and Net described in the "Entomologist," 1893, and a considerable discussion ensued.

Mr. Step stated that he had found that the flowers of the Butcher's Broom (*Ruscus aculeatus*, L.) were produced in pairs on the phylloclade, but only one bud opened at a time.

March 22nd, 1884.—E. Step, Esq., President, in the chair.

The Rev. J. E. Tarbat, The Common, Weybridge, was elected a member.

Mr. South exhibited a long bred series of *Tæniocampa gothica*, L., including many var. *gothicina*, which he had received from Mr. Rose, of Barnsley. The whole were large and of a deep red shade; also buds of *Arundo phragmites*, L., from Hampshire, which were infested by a large dipterous larva.

Mr. Turner, a long series of *Hybernia leucophearia*, Schiff., taken this year, including a considerable number of melanic forms.

Mr. Adkin, a series of the same species from the New Forest, the common form, among them being the white banded one.

Mr. Auld, a very large recently bred specimen of *Ocneria dispar*, L.

Mr. Sauze, a Locust (*Œdipoda tartarica*), captured at Brixton among vegetables imported from Italy.

Mr. Edwards, a number of reptiles and other zoological specimens which he had just received from Penang.

Several members noted that *Tæniocampa munda*, Esp., *Asphalia flavicornis*, L., *Diurnia fagella*, Fb., and *Semioscopus avellanella*, Hb., were out.—Hy. J. Turner Hon. Report Sec.

ESSEX FIELD CLUB.

The 14th annual meeting was held at the Hall, Buckhurst Hill, near Woodford, Essex, on the 31st March. The report of the council was received. The treasurer's accounts showed a fair balance in hand, but it was pointed out that in order to carry out the objects for which the club was formed 600 members were required, whereas there were only 400 at present on the roll. All the officers were re-elected and the routine business transacted. A discussion took place as to the desirability of reducing the cost of the *Naturalist*, the Society's official medium, and also as to the abolition of the entrance fees, but nothing was definitely settled. The President then read "A Sketch of the development of Architecture in Essex."

ORNITHOLOGY.

The Grey Phalarope, *Phalaropus fulicarius* (Linn.).—The Phalarope family is not a large one; it consists only of two European species—the Red-necked and the Grey. The former is very rare, while the latter, although by no means common, may be termed an annual visitor in the autumn to this country. Naturalists have been puzzled where exactly to place the Phalaropes—a miniature gull on the water, in flight a sandpiper, while the lobed feet point to its relationship to the coot. No wonder that various authors on ornithology have differed on this point. Yarrell and Morris in their "British Birds" place the Phalaropes between the *Anatidæ* (geese) and the *Rollidæ*, or Rail family, but by most authors they are now classed amongst the *Scolopacidæ* (sandpipers and snipes). The first time I saw the Grey Phalarope was in the month of September on the river Axe, where they were swimming about with the short, jerky movement peculiar to the bird. They seldom penetrate far inland, although I heard of two being killed near Yeovil, in Somersetshire, in 1891. Some years afterwards I saw these birds to perfection when passing a small flock at sea. Their resemblance to the gull and terns is then most noticeable, owing to the plumage and the manner in which they cross their wings, as well as the ease with which they ride the roughest sea. D'Urban and Mathew, in their "Birds of Devon," state that "when violent southwesterly gales blow, the migrating flocks on their passage south are driven into the English and British Channels, and are noticed in great numbers along the sea shore." Perhaps this was the cause of the occurrence of the Grey Phalarope during September and October, 1866, in the southern counties of England and Wales. In a pamphlet issued by J. H. Gurney, jun., on the occurrence of the bird in that year, it appears that they were killed in 21 counties. Most specimens were perhaps taken then in Sussex. Nor were they entirely confined to the South, for three were killed near Allonby, in Cumberland, and one is reported to have been shot near Tadcaster, in Yorkshire, on a manure heap, by a clergyman; and one in Bedfordshire, and one in Cambridgeshire. The Phalarope seems to be suited for both elements, having a strong flight as well as great swimming powers. The birds that visit us seem to be extremely fearless, and are easily approached (this may, however, be caused by exhaustion). They are in plumage mostly immature or changing from summer to winter. This seems to be an additional reason why the lives of these gentle and beautiful birds should be spared when they make our island a resting place, and should not, as one author so truthfully writes, "meet with the usual hospitality accorded to rare birds, and be shot down and stoned to death while they are vainly seeking shelter on the beach."—John H. Still, Seaton, Devon.

The Greater Spotted Woodpecker *(Picus Major)*.—It is very seldom that the Greater Spotted Woodpecker is to be seen near a busy town, but a fine specimen was shot on the 12th of February, by Mr. James Casey, at Oxton, Birkenhead. The Greater Spotted Woodpecker feeds on insects, nuts, acorns, and the seeds of the pine and fir, and in order to crack the nuts and acorns it places them in the clefts of the trees. To obtain the insects which live in trees, this bird drives its bill into a crack and makes a tremulous sound, as if the tree were splitting, which has the effect of causing the insects to leave their haunts within and come to the spot where the bird may be. The sound produced may be heard for half a mile distant, and one operation will be continued for half an hour. This bird also feeds on wall-fruit, plums, cherries, and other like fruit, committing great havoc with the resources of the fruit grower. It also alights on moss, and other vegetable matter, where it finds a plentiful supply of spiders, ants, and other insects. The eggs of the Greater Spotted Woodpecker are of glossy white, between four and six in number, and are deposited upon the decayed wood at the bottom of a hole in a tree.

COLEOPTERA.

Coleoptera at Carlisle.—On February 6th, Mr. G. B. Routledge exhibited at the City of London Entomological and Natural History Society a quantity of beetles collected by himself in this district, which included representatives o the following species :—*Pterostichus versicolor*, *Amara ovata*, and other Carabidæ ; *Necrophorus ruspator*, *Silpha nigrita;* five species of Coccinellidæ ; four species of Telephorus ; *Corymbites cupreus*, *Limonius cylindricus ; Barynotus schönherri*, and other Curculionidæ.

Sphodrus Leucophthalmus.—I took a specimen of this beetle at the base of a pillar in St. Nicholas' Church, Gloucester, on September 12th, 1893. My friend the Rev. J. J. Luce is the vicar, and the church has just been renovated. The bases of the pillars are two or three feet below the level of the paved floor. A space had been left to show the footing of these pillars ; and in the dark I observed a still darker object, and stretched down at full length in the aisle to capture it—much to the amusement of the Vicar. On getting back to my lodgings I found my insect to be *Sphodrus leucophthalmus*.—R. Beck, Southampton.

LEPIDOPTERA.

Lepidoptera at the Sallows.—Sallow is very productive of common species this year. Last week I could have taken thousands of *cruda*, *stabilis*, *gothica*, &c., but the better species are absent.—A. E. Gibbs, St. Albans, Herts, March 31st.

Early appearance of Pieris Rapæ.—A fine male specimen of the Pieris Rapæ was taken in this neighbourhood on the 2nd February last.—Miss Owen, Newholme, Latchford.

BOTANY.

Early Flowers.—The lesser Celendine *Ranunculus Ficaria* was noted in flower at Appleton, Cheshire, on the 17th March, and I found the Wood Anemone, *Anemone nemorosa*, in the Dingle, at Appleton, seven days later in full flower; while the Butturbur, *Petaxitur vulgare* was found in the Meadows at Arpley, near Warrington, in flower, on the same date.—L. Bolton, 68, Wilderspool Causeway, Warrington.

NOTES.

A New Coal-tar Product.—I observe on page 42 of the *British Naturalist*, a journal which I esteem very highly, a " Note " which may probably mislead some of your readers. Toluol or toluine, as it is sometimes called, is by no means a newly invented or discovered liquid. It is a member of the benzine or aromatic series, which have the following order in respect of volatility:—Benzine, toluine, xyline, and culmine. It is, for the reason given in the "Note," very suitable for use in thermometers, but its colour is not blue, but "white" in the sense of water-white, that is to say, it is perfectly transparent, but capable of dissolving some of the coal-tar colours, especially after the addition thereto of a little amyl or fusel oil, so as to be intensely coloured. Toluol is the base of the substitute for sugar known as "Saccharine," which is several hundred times sweeter than sugar, and of the colour known as "magenta." This last will give an indication of its antiquity. A very wide range of colouring matters are made from it, and it is also employed in the synthetical preparation of benzoic and cinnamic acids and their derivatives. Its chemical name is "Methylbenzine," and it was first discovered by Pelletier and Walter, as a tar product from the destructive distillation of the resin of *Pinus maritima*. It can also be prepared from wood spirit and vegetable tar.—W. E. H.

The Effects of Cold upon "Insect Pests."—There is a popular idea that when a hard frost gets into the ground it kills the grubs. Such, however, is not the case; if anything, the frost protects them. During hard weather most of the insects pass deep into the soil, and so escape the cold. Those that remain above are quite impervious to its effects. The maggots of the turnip-gall Weevil, even when extracted from their gall, can withstand 20° of frost (F.) and even 30° does not kill them, unless continued for some little time. In their galled patches I find they can withstand even greater extremes, and this only retarding their development a few days. I have often noticed wireworms upon the ground alive when the thermometer has been down to 17° of a night, and two cases I find in my notes where wireworms were found amongst white turnips in 1886, the thermometer registering 6° above Zero (F.) only. The majority of pests, however, pass the winter in the egg and pupal stages (some also as adults). In these stages the cold in England has no effect, except in retarding development. It is not at all an uncommon thing to find the chrysalids of some of our Rhopalocera frozen quite hard, and brittle as glass, and yet alive. As I have mentioned the Rhopalocera (butterflies) here, it is as well to point out, that they are not all injurious to crops, as I have more than once heard and seen stated! Four species only can be claimed as injurious insects, and we must remember that we have 72 recorded species. I should advise those who are interested in horticulture and agriculture not to be misled by incompetent people recommending them to carry out the wholesale destruction of such (and other) insects. If they do they will soon discover they are doing more harm than good. But more of this anon. To return to our subject, frost not only does no good in killing such insects as are obnoxious, but the hard state of the ground actually protects them. They are driven deeper into the soil, and at the same time the hard ground protects them from the prying eyes and strong beaks of many of our birds, which would otherwise destroy them in large numbers.—Fred. V. Theobald, M.A., F.E.S.

On Aciptilia Migadactyla, Haw.—(Spilodactyla, Curt.).— Mr. Dale does not, apparently, appreciate the meaning of the passage in the January number of the *British Naturalist*, page 8, which he criticises. What has the dictionary meaning of the word "original" to do with my usage of the word in its relation to its context? Naturalists have adopted a very wise rule, that the earliest name of a species given with a description or figure of that species recognizable, shall be the name of that species. Fabricius gave a short description of a white "plume" moth, which he named *migadactyla*, and a few years afterwards Haworth, describing *only British species*, believed he recognized in this description a British species. He therefore quotes the original description of Fabricius, applies it to the British species, but extends that description by references to its habitat, &c. Many years afterwards Haworth's species is described under another name (*spilodactyla*) by

Curtis, and then Wocke (than anyone more ignorant of British species *outside* this country, it is more difficult to imagine), probably misled by Wood, who had erroneously figured *ochrodactyla* as *migadactyla*, immediately concluded that Haworth's *migadactyla* referred to *ochrodactyla* also, and put it so in the *Catalogue.* But this was impossible, since Haworth had already distinguished *ochrodactyla* from *migadactyla.* This error led me to investigate the matter, which is clear enough until Haworth is reached. Although I have been studying Continental "plumes" for many years, I do not pose as a critic of Continental species. Therefore, I said, "I have left entirely out of account the Fabrician *migadactyla*, as there may be a white Continental (*not British*) species to which the description might apply, but that does not influence Haworth's use of the name for our species." This surely is a fair statement of facts, as far back as I can follow the subject. Now, if Mr. Dale has any knowledge of Fabricius (personally or from books) and can become a critic behind that point where I leave off, I shall be pleased to say that *migadactyla*, Haw. is *migadactyla*, Fab. On the face of the description alone, I think it very probable, but (and this is the factor which deterred me from feeling certain that this was so) it is quite possible for a short diagnosis to comprise two or even more species, and be an equally good (or bad) description of either, or each, and yet from incompleteness, or some other factor, the differentiation of any one of the species may be impossible, and this I feel may be the case with Fabricius' description. When Haworth copies a previous description and extends its application it appears to me reasonable to suppose that he becomes responsible for its usage, so far as he accepts it, for his own species, *i.e.*, the one before him, and of which he is writing, and to assume otherwise would lead to endless trouble and difficulty. I may state that I myself gave Mr. Dale the clue on which he has based his paragraph, *vide ante*, p. 8, where I write "*Fab.*" otherwise I cannot see that Mr. Dale would have referred to the matter. One other point I would like to refer to. Mr. Dale writes :—"Moreover, he did not name and describe a species as *migadactylus*, but merely copied Fabricius." This is true, as far as it goes, but Haworth did describe a species under *migadactyla*, first quoting Fabricius' diagnosis, and then further describing in his own words its relations to allied species, habitat, &c., which Fabricius apparently did not know; and then Mr. Dale goes on to say, "Moreover, he (Haworth) did not possess *spilodactylus*, Curt." Now, Mr. Dale must be in serious error here, but if he really means what he writes, I must ask him in what part of the Shades he discusses with the spirit of Mr. Haworth what the latter had in his collection at the beginning of the century. When a writer lately suggested that the shades of departed entomologists might still pursue their little fly-catching in the regions across the Styx, little I knew that Mr. Dale had solved the mystery, by being in spiritual communication with the shade of the late Mr. Haworth.—J. W. TUTT, March 20th, 1894.

GEOLOGICAL PHOTOGRAPHS.—During the last few years the suggestion, made at one of the meetings of the British Association, that a Geological Photographic Survey should be undertaken, has been more or less acted on. A number of views worked in the permanent platino process have been taken for the National Collection of the Geological Photographic Committee of the British Association, and Granville A. Cole, F.G.S., M.R.I.A., Professor of Geology in the Royal College of Science, Dublin, assisted by Mr. McHenry, of the Geological survey of Ireland, has supplied the requisite descriptive matter to each view. In looking through some of these aids to the study of geology several appeal very forcibly to us, and amongst them may be specialised "Pockets of Altered Flints,"—as shown in the cuttings of the Cave Hill quarries, Belfast,—and eroded surface of indurated chalk, the latter with bands of flints *in situ*, overlain by basalt. The flints in this area, on the old eroded chalk surface, are frequently reddened and baked by the action of the Eocene lava streams. The section in the volcanic neck filled with ash and agglomerate at the Bridge of Carrick-a-Rede, Co. Antrim, offers materials for the study of volcanic action, and Pleaskin Head, in the same county, a structure of massive and columnar basalt lava flows, 374 feet high, offers further opportunities of studying those early changes in the earth's crust. The higher flows are beautifully columnar in their lower portions, and show the typical upper layer of more finely columnar and irregular structure. There is a band of pisolite iron ore running half way up the cliff. In Kenbane Head we have the illustration of a narrow, seaworn promonotory of chalk. The Basalt plateau of Rathlin Island is seen in the distance. The promontory is intersected by basalt dykes, which weather out as caves; while in the photograph of Murlough Bay, also in the County Antrim, the metamorphic rocks are well brought out, as are likewise ancient schists, lower carboniferous coal bearing strata and intrusive dolerites. In the foreground the schists are at the surface; in the middle distance are carboniferous rocks, penetrated by intrusive schists, which are weathered out into scarps and sea-stacks, while in the distance is sighted the great cliff of the intrusive dolerite of Fair Head, with gentle slopes of lower carboniferous sandstone. The selection includes the cretacous and carboniferous rocks, dolerite, estuarine deposits, igneous rocks, new red and old red sandstone deposits, raised beaches, and stratifications, &c., &c., and the list, which can be obtained from Mr. Robert Welsh, Lonsdale Street, Belfast, is well worthy the attention of all who take any interest in the interchanging phenomena of the earth's surface.

The Aurora Borealis.—It is seldom the Northern Lights, or Aurora Borealis, are seen to advantage in these latitudes, but a brilliant display was witnessed in the Lake District on the early morning of the 31st ult. It is half-an-hour past midnight, and the dogs are barking in the far away Crosthwaite valley farms; the owls are hooting lustily, and the birds are astir in the holly bushes and flutter in the laurels. It is as bright as dawn, so bright that it is sufficiently easy to see to write a letter and describe one of the most beautiful displays of Aurora Borealis which has for years past ever been witnessed in this district. Skiddaw lies dark and grey against a bank of palpitating brilliancy, the streamers of light shoot up more than half-way to the zenith in three well-defined bands, between which the colour is sometimes pink, at other times changing to a violet hue. The coruscations dart across the colour bands, mingling therewith their silvery darts and making the whole heavens gleam. The splendour dies away, and a light haze hangs in grey folds over Skiddaw. Instantly the haze in the valley is swept away, and a great light, as like the reflection of a great conflagration beyond the hills pierces the heavens, and the stars and constellations to the north-east are lost in a sea of trembling splendour. Great flashes of shooting light that almost seem to touch the trees of the garden on the hill, illuminate the sky from the Lion to the Northern Bear, bringing into existence weird forms which for the moment are almost stationary, and then dissolve into thin air. Close above are flashes which, quite apart from the great triple arc of light which scintillates and palpitates beyond Skiddaw to the North, come and go, giving rise to the feeling that these brilliant displays portend to nothing good, easily making us comprehend how the old dwellers in the valley regarded these Northern Lights as harbingers of ill omen, and of the coming Judgment Day.—Correspondent.

A new list of works relating to botanical subjects (published previous to the year 1800) and to the study of botany generally has been issued by Messrs. J. B. Baillière et Fils, 19, Rue Hautefeuille, Paris. The compilation gives the titles and authors of over one thousand works and treatises dealing with this interesting section of natural science, which is daily engaging more freely the attention of students and those whose avocations bring them directly into contact with the life history of trees. It will be of great value also to those interested in the investigation of the development and progress of the science, and will be forwarded by the publishers to all readers of the *British Naturalist* who may require it.

OBITUARY.

WILLIAM PENGELLY, F.R.S.

Mr. William Pengelly died at his residence, Lamorna, Torquay, a few days ago, at the age of 82. For nearly 60 years he had been well known for his studies in natural history and for his researches into the existence of prehistoric man. His exploration of Kent's Cavern, undertaken under the auspices of the British Association, occupied 16 years. He was the author of various geological papers, and wrote, in conjunction with Dr. Heer, of Zürich, a monograph on "The Lignite Formation of Bovey Tracey, Devonshire." He further collected and arranged the Devonian fossils, which, under the name of "the Pengelly Collection," were lodged in the Oxford University Museum by the Baroness Burdett-Coutts. Mr. Pengelly re-established the Torquay Mechanics' Institute in 1837; a few years later he originated the Torquay Natural History Society, and in 1862 he founded the Devonshire Association for the Advancement of Science, Literature, and Art. He was a fellow of the Royal Society and of the Geological Society, and a "membre titulaire" of the Société d' Anthropologie of Paris.

CHARLES GEORGES POUCHET.

The death is announced of Dr. Charles Georges Pouchet, Professor of Comparative Anatomy at the Natural History Museum, in Paris. His father was the famous naturalist, Felix Pouchet, who devoted himself to physical science. Dr. Pouchet, the son, also gave much of his attention to the investigation of physical science, and besides conducting several scientific missions, made a voyage of observation in Iceland. He was born at Rouen in the year 1833. Amongst numerous works of which he was the author the following may be mentioned:—Les Colorations de l' Epiderme, De la Pluralité des Races, Humanes," which has been translated into English; Mémoire sur le Grand Fourmilier, and Traité d' Ostéologie Compareé.

NOTICE.

Many of our subscribers having urged the formation of a Microscopical section in connection with the *British Naturalist*, we have decided to arrange this, and also in connection therewith for a circulating slide cabinet. This section will be subdivided into decades or circuits of ten persons, and will, it is hoped, be the means of giving a greater impetus to microscopical investigation in the various branches of Natural History. A note book accompanies each cabinet. Those interested and desirous of participating will be good enough to send their names to the EDITORS *British Naturalist*.

NOTICE TO COLEOPTERISTS.—I shall be glad to receive notes relating to the occurrence, &c., of the *genera* CALATHUS, TAPHRIA, and ANCHOMENUS, as early as possible, for the May part of *British Naturalist*.—G. A. LEWCOCK, 73, Oxford-road, Canonbury, N.

BOOKS, &c., RECEIVED.

"*Entomologist's Record and Journal of Varieties.*"
"*Welsh's Geological Views, with Descriptive Notes.*"
"*Irish Naturalist.*"
"*The Naturalist.*"
"*Science Gossip.*"
"*Journal of Trinidad Field Naturalists' Club.*"

TO CORRESPONDENTS.

Subscriptions, Exchanges, Correspondence, Notes, Papers for Publication, and all other communications must be addressed to the Editors "British Naturalist," Warrington.

All Exchanges, Queries, &c., for insertion in the following number, must reach us not later than the end of the previous month. All Queries must bear the writer's name.

Disguised Advertisements for the purpose of evading cost of advt., will not be inserted in the gratuitous exchange column. We request all Exchanges may be signed with name (or initials), and full address at the end.

Correspondents will please note and write on one side of the paper only.

ARACHNIDA.—*The Rev. Fredk. O. Pickard-Cambridge, High Street, Swanage, will name and ret[illegible]any collections of British Spiders received from correspondents of the "British Naturalist," provided that several tubes be sent for their reception. He would also be glad to send types of British genera in return for any specimens he might wish to retain. The specimens* need not *be separated into tubes before sending, but a label, ready addressed and stamped, should always be enclosed. If the specimens are placed in separate numbered tubes, a paper, also numbered, should be sent for the reception of the names.*

ACARINA.—*Mr. C. F. George, Belle Vue House, Kirton-in-Lindsey, will name any specimens of Acarina sent to him for that purpose.*

DIPTERA.—*The author of "British Flies" (Diptera), Fred. V. Theobald, M.A., F.E.S., 12, Trumpington Street, Cambridge, will name specimens of Diptera sent to him for this purpose. He will also advise on the subject of injurious insects.*

CONCHOLOGY.—*(Land, Freshwater.) Mr. C. O. Pickard-Cambridge, Balliol College, Oxford, will name shells sent for identification. Applicants must keep duplicates of specimens sent.*

BRITISH ODONATA (DRAGON FLIES), AND BRITISH ORTHOPTERA.—*Mr. W. Harcourt, Bath,* 195 *Ladywood Road, Birmingham, will name specimens and answer questions referring to above orders.*

LEPIDOPTERA.—*Mr. Eustace R. Banks, M.A., F.E.S., The Rectory, Corfe Castle, Wareham, will name specimens of Lepidoptera sent to him for that purpose. Applicants must, however, send addressed label when requiring specimens returned.*

MOLLUSCA: MARINE AND TERRESTRIAL.—*Mr. B. Tomlin, The Green, Llandaff, will name specimens of the above Mollusca sent to him by subscribers for the purpose.*

DIPTERA.—*Mr. R. H. Meade, Mount Royd, Bradford, will verify and correct the names of specimens of Diptera sent to him by subscribers for that purpose.*

BRITISH COLEOPTERA AND HEMIPTERA-HETEROPTERA.—*Mr. E. A. Newbery, 12, Churchill Road, Dartmouth Park, N., will name and return any specimens of the above Orders sent to him by our subscribers for that purpose. A stamped label for return should accompany each box.*

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Duplicates.—Filigramaria, Zonaria, Chi, Ulmata, Didymata, Glauca, Festucæ. *Desiderata.*—Numerous local series.—J. W. Baldwin, 472, Darwen-road, Dunscar, Nr. Bolton.

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City of London Entomological and Natural History Society.—Books lost in the fire at St. Mary Axe.—Will those gentlemen to whom I have not replied kindly take this as an intimation that all the volumes are now replaced?—G. A. Lewcock, 73, Oxford-road, Canonbury, N.

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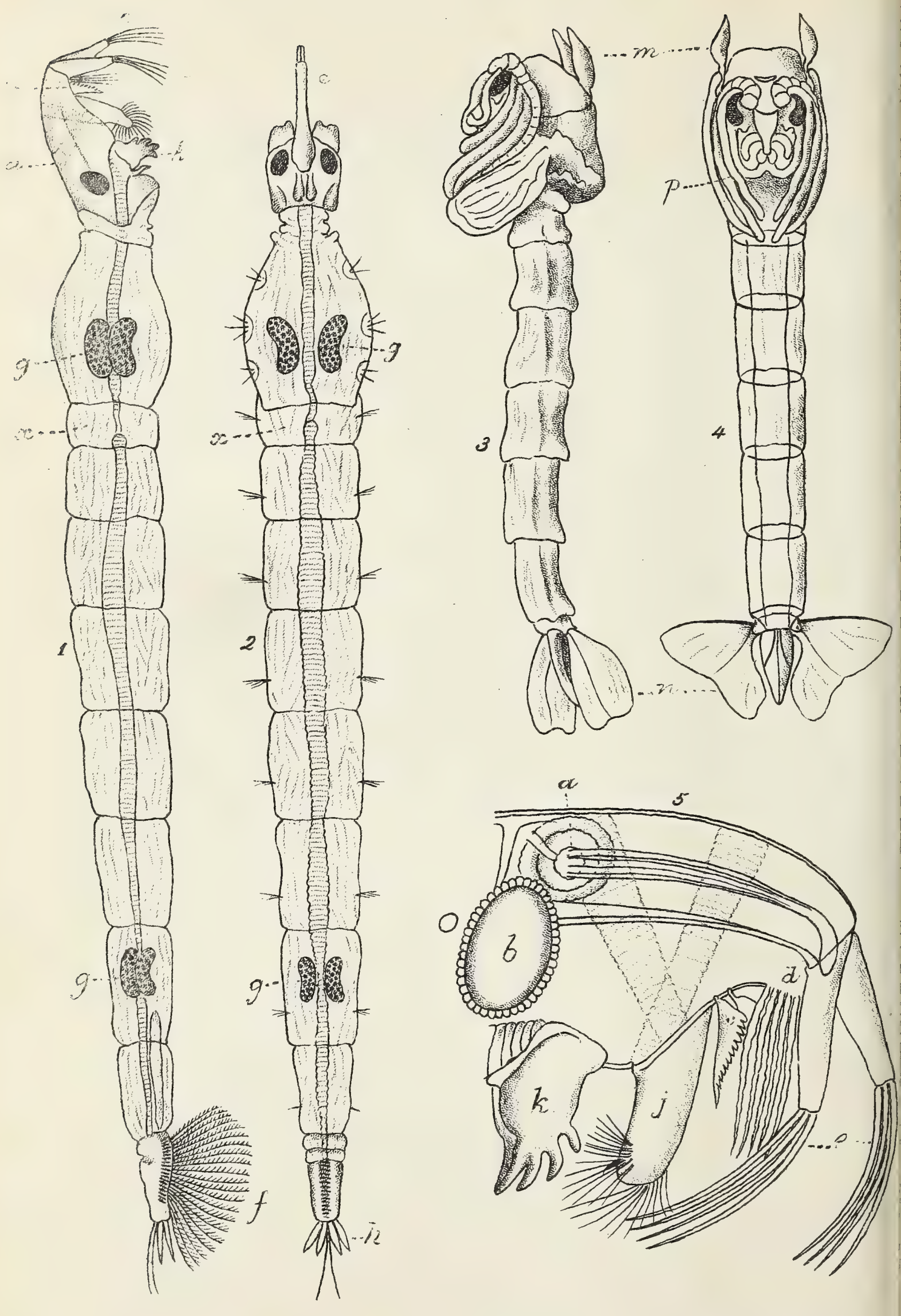

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BRITISH NATURALIST.

NEW SERIES.

SOME CURIOUS AQUATIC LARVÆ.

BY GEORGE SWAINSON, F.L.S.

The ordinary entomologist is sometimes charged with being nothing but a collector of moths and beetles, etc., and with taking little or no interest in the life histories of his specimens. We know how untrue this is as regards the working naturalist, who studies the feeding and vagaries of his pet insects most assiduously. When we think, however, of the large number of dipterous and other insects which fill our museum cabinets, and whose larvæ are still unknown, it is to be hoped our

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Explanation of Plate V. Corethra Plumicornis.

Fig. 1.—The larva.

a. Cephalic or brain ganglia
c. Saw-like organ.
e. Long oar-like appendages.
f. Lateral plume or swimming fan.
g. Air sacs.
k. Plate-like jaws or mandibles.
x. Dorsal vessel or heart.

Fig 2.—Larva, dorsal view.

e. Long oar-like appendages.
g. Air sacs.
h. Swimming fan.
x. Dorsal vessel.

Fig. 3.—Lateral view of pupa.

Fig. 4.—Dorsal view of pupa.

m. Air trumpets to tracheæ.
n. Tail plates.
p. Tubules adjacent to cephalothorax.

Fig. 5.—Enlgarged drawing of head. (Fig. 1).

a. Cephalic, or nerve ganglia.
b. Compound eye,
c. Saw-like organ.
d. Labial bristles.
e. Oar-like appendages or antennæ.
j. Prehensile organ.
k. Tooth plate-like jaws or mandibles.

younger naturalists will take up the study, for it is a very wide and open field, and one that will well repay a little attention.

It is my purpose to write a few notes on some new and little-known larvæ of the Diptera. These two-winged flies have, most of them, been well known from the days of Aristotle, who first classified them. They have accompanied man in all his peregrinations, and have been a considerable annoyance to him and his domestic animals, etc., through all the centuries, and yet it is only quite recently the life histories of the Gnat, the Blow-fly, the Daddy Long-legs or Crane fly, the Wheat midge or Hessian fly, the Bot fly, and the Gall fly, and others, have been fully worked out; and the large amount of work yet to be done opens an exceedingly wide field for investigation. It is only by enrolling those interested in the evolution and development of insect life that any progress can be made, and I do not know that any subject offers the earnest student a nobler aim than does the study and investigation of this branch of natural history.

We well remember in our boyish days pondering over the phenomenon of living matter constantly undergoing change, as seen in the pupa or chrysalis of the Moth or Butterfly. Oh! how we wanted to look inside and watch the marvellous changes going on. How was it all effected? No doubt many of our readers in days gone by have felt the same keenness for the acquirement of this knowledge. Well, recent biological research has laid all this open and plain before our eyes. The German Professor Weissmann can show you the imaginal discs in the larva, which later develop into folds, and which ultimately become the antennæ, eyes and wings of the imago, and you can follow the growth of these by wonderful sections through the pupa. The serial section cutting, by means of the microtome, has enabled us to follow the processes of Nature by which these changes take place to an extent little dreamt of by our scientific ancestors.

But in many of the transparent aquatic larvæ, by careful preparation, staining, and mounting, the imaginal discs of Weissman can be clearly made out, now that we know what they are.

In the plate* which accompanies this number we present our readers with details of the larva and pupa of *Corethra plumicornis*, the well-known Phantom Larva, which no doubt many who are fond of pond-hunting have captured, and watched with interest whilst making its curious leaping jerks. It looks like a transparent rod of glass, with two black spots on it. These are the air-sacs which enable the larva to poise with such certainty, but they greatly add to the difficulty of mounting these larvæ, for unless the contained air is got rid of by a gradual increase in the grading of the spirits of wine, before putting the larva into absolute alcohol, the air-sac bursts when in Canada balsam, and scatters the air bubbles throughout the micro-mount.

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* We have to thank our friend Mr. A. Hammond, F.L.S., for the beautiful lithographic plate which is drawn from nature, except Fig 5., which is a reproduction of Weissmann's drawing. The natural size of *Corethra* is two-thirds of an inch.

You will at once recognize Fig. 1 in the plate, while in Fig. 2 you have the dorsal view, the said air-sac being marked *g*. These are filled with air from the tracheæ, and have an exterior coating, filled with pigment cells, which show up well under the ¼-inch objective when mounted. There are few more beautiful objects for the microscope than the lateral plume or swimming fan (Fig. 1, *f*), while in the dorsal view at Fig. 2, *h*, is seen the terminal plates full of tracheal filaments.

Passing upwards along the alimentary canal, we come to the upper end of the stomach, near which is a dorsal vessel or heart, (Fig. 1, *x*), and above this on the upper side of the muscular pharynx lie the front pair of air-sacs, larger in size. On the ventral side there is a chain of nerve ganglia, which runs up to *a*, Fig. 1 and 5, the cephalic or brain ganglia, which controls the muscles of the head, of which Fig. 5 is an enlargement. The compound eye (Fig. 5, *b*) is a very beautiful object, but I am rather puzzled with the saw-like organ (Fig. 5, *c*), above which are the labial bristles (Fig. 5, *d*). It may be this saw is for breaking up the varied *entomostraca*, &c., which the long oar-like appendages (Fig. 5, *e*), or antennæ, as some call them, sweep into the mouth, where they are quickly seized by the prehensile organ (Fig. 5, *j*), with its bunches of bristles, and carried to the toothed plate-like jaws or mandibles (Fig. 5, *k*), where they are soon reduced to a state fit for digestion.

The Phantom Larva is also very interesting in the nymph or pupal state. If you are watching his jerking leaps after food in a glass jar of water, you may be fortunate enough to witness the almost instantaneous change from the larval to the pupal condition. It is most singular, for instantly, with a more vigorous jerk than usual, presto! he has disappeared under your very eyes. But see, there near the top of the water is floating a new and different insect altogether (Figs. 3 and 4).

It now possesses a much larger head, and has two large projections sticking up like the collar of a well-known statesman. (Lancashire naturalists call it Gladstone or Randolph Churchill, according to their predilections). These (Fig. 3 and 4, *m*) are the "trumpets" for the admission of air into the tracheæ, and very curious they are when minutely examined.

How very different are the tail plates of the pupa (Fig. 4, *n*) from the posterior organs of the larva. The metamorphic changes now rapidly progress, and soon the pupa bursts down the back and out comes the *Corethra* fly or midge, balancing himself on the empty sarcophagus (which is curiously full of air), until he can spread his wings and fly off.

Prof. Miall has carried Prof. Weissmann's investigations a step further in the excellent description of the life history and development of *Chironomus dorsalis*, the "plumed gnat," to which we shall have to refer again shortly. Both in *Corethra* and *Chironomus* the metamorphic changes are gradual, and extend through a portion of their larval as well as pupal existence, but this is not so in the *Lepidoptera*, for, says Professor Poulton as to these, "the formation of imaginal appendages within the pupa is deferred until very late, and then takes place rapidly in the lapse of a few weeks."

In the larva of *Corethra*, however, the changes do not proceed so far as they do in *Chironomus*, and we fancy the reason for this is to be found in the small size of the head and neck of the larva; but they must have extended a little, for we find immediately after the marvellously rapid ecdysis of *Corethra* into the pupa state that the development of the eyes and the bulbs of the antennæ can be clearly discerned, as well as the wings and legs of the fly, by focussing through the curious tubules which lie adjacent to the cephalothorax of the pupa (Fig. 4, *p*).

We know of nothing in the metamorphoses of the Invertebrata so rapid as this; the nearest approach to it being the development of the larval *Actinotrocha* into the Gephyrean worm, *Phoronis*, which is effected by a rapid process of turning inside out. These points form some of the difficulties which the late Professor Milnes Marshall admitted in his lectures he was met with in proving the "Recapitulation Theory," which on the other hand seems to fit in so well with the evolution and life history of the Crustaceans.

Many of our readers who are pond hunters, or who possess a microscope, and live in the country, must have met with the curious Bloodworm often found among the roots of watercress, &c., and sometimes, where there are careless servants, even when it comes to table, for the hooks on its two pairs of false feet make it rather difficult to wash off. No wonder it was called the "Harlequin" larva *(Chironomus)* from its jerking and bounding leaps. When Professor Miall, lecturing before the British Association at Cardiff, described some of these aquatic larvæ, an old friend was immediately recognized. It was therefore exceedingly satisfactory when the monograph of *Chironomus dorsalis* appeared in the transactions of the Linnean Society, and all interested in this subject must be urged to examine the splendid detail drawings of the larva, pupa and fly made by our indefatigable friend Mr. Hammond, F.L.S., in collaboration with Professor Miall, F.R.S.*

(To be continued.)

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*Transactions of the Linnean Society, Vol. 5, part 8.

THE KINGFISHER. (ALCEDO ISPIDA.)

BY PHILORNIS.

Any of our readers who have the opportunity of strolling along the banks of a quiet brook or by the side of some secluded mere will be familiar with this beautiful bird, which like a gleam of azure light shoots swiftly by or dips down to the surface of the water. No one who has seen the kingfisher darting past in the brilliant sunlight of a summer afternoon can have failed to admire this "living gem," and wished to know something of its life and habits.

Many, perhaps a majority, of our readers have probably not been so fortunate as to see this somewhat solitary bird, which, however, is not so rare as most people suppose. It is scarcely possible to convey in words a just idea of the beauty and brilliancy of the plumage of the kingfisher; its glossy blue-green back and head, its red breast and feet, its yellowish white throat, all unite to make it one of our handsomest birds.

Though its plumage makes it a favourite victim of the birdstuffer, its numbers do not appear to be seriously diminished, and those who know where to look for it will have little difficulty in finding the kingfisher, even close to the suburbs of our northern manufacturing towns. This may be due to the number of its eggs (usually seven or eight, spotlessly white), which are laid in April at the end of a deep burrow excavated in a bank overhanging some brook or river, and affording a safe hiding place for the young birds. To secure either eggs or young some determination is necessary, for the burrow will only admit the insertion of one arm, and the fragments of fish-bone, with the not too pleasant smell arising therefrom, will deter any but the most enthusiastic collectors.

The brook near which it makes its home provides the kingfisher with food; perched on an overhanging bough, this stolid disciple of Cotton and Walton (or was he their teacher?) keeps a keen watch—one is tempted to say "his eagle eye," but that would be an injurious comparison—on the surface of the water. As soon as some unwary fish—troutlet it may be or stickleback—ventures too near the surface, the kingfisher darts from its post of vantage, and catching the victim in its long and powerful bill returns to the bough, against which it sharply beats its victim once or twice, and then swallows it, whole and headforemost.

Unlike some human parents, the kingfishers not only feed but educate their young. The wariness of the birds necessitates patience and caution on the part of those who would watch them, but one who has seen the old birds and five young ones sitting on a bough which hung like a bridge over a small trout stream will not readily forget the parental care displayed; nor is such a sight likely to lessen that admiration of the kingfisher which was first called forth by the beauty of its plumage.

The family of birds of which our kingfisher is typical (Alcedinidæ) comprises about one hundred and fifty species grouped into several genera, and is of world-wide distribution, though most numerously represented in the Indian and Malayan regions. Some of the tropical species are not fish-eaters, preying rather on small reptiles, insects, and the like. All are boldly and brightly coloured.

The curious Halcyon myth of the ancient Greeks is associated with the kingfisher, of which, in fact, Halcyon is the Greek name. Alcyone having been warned by the gods in a dream that her husband Ceyx had been drowned whilst on a voyage to consult one of the oracles, went down to the shore, and finding his body, threw herself in her passionate grief into the sea. She and her husband were changed into kingfishers; and during the time that their eggs are hatching in their nest floating on the surface of the sea,—the period of incubation being the weeks preceding and following the winter solstice,—the seas are calm and safe. With slight variations, this myth, circulated widely, was often alluded to by the later Latin poets, *e.g.*, Virgil, "dilectæ Thetidi alcyones," and the term "halcyon days" has passed into our own literature as expressive of a period of calm and peaceful enjoyment. Dryden sings:—

"Amidst our arms as quiet you shall be
As halcyons brooding on a winter's sea."

ACIPTILIA MIGADACTYLA, HAW. (SPILODACTYLA, CURT.)—*VIDE ANTE* pp. 77, 100.

Having received the following post-card from Mr. Tutt, respecting the paragraph as it appeared on page 100 of this journal, we have decided to reprint the reply *verbatim*, so that our readers may judge the question for themselves.—THE EDITORS.

"As I am not at all anxious to see my name in print, I would be exceedingly obliged if at any future time any entomological communications wh. I may make to the Mag. be printed as I send them OR RETURNED. I have got to that cond^{n}. of mind in wh. I understand what I want to tell the Entom^{l}. public better than anyone else can understand or tell them for me. Excuse my speaking plainly but I must insist that you either print what I write OR leave it out altogether. To have my name attached to what you have pub^{d}. in the *Brit. Nat.* (page 100) is rather a fraud on an educated man's knowledge of grammar as well as on his ability to tell people what he wants to say. Please don't hesitate to return anything I may send wh. is unsuitable for the Magazine BUT in future don't alter it. I would be pleased if in the next issue you would add that I am disinclined to take the responsibility of the note as YOU have written it."

On Aciptilia Migadactyla, Haw. (= Spilodactyla, Curt.).—Mr. Dale has been unfortunate in his discussions lately, and I have had to complain elsewhere that he does not keep himself *au fait* with the science he attempts to ornament. Whatever on earth has the dictionary meaning of the word "original" to do with my usage of the word in relation to its context, and still further, what has such a quibble to do with science or common-sense. Naturalists have adopted a very wise rule that the earliest name of a species given with a description or figure of that species which is recognisable shall be the name of that species. Fabricius gave a short description of a white "plume" moth which he named *migadactyla* and a few years afterwards Haworth describing *only British species* believed he recognised in this description a British species. He therefore quotes the original description of Fabricius, applies it to the British species but extends that description by references to its habitat etc. Many years afterwards Haworth's species is described under another name (*spilodactyla*) by Curtis and then Wocke (than anyone more ignorant of British species *outside* this country it is more difficult to imagine) probably misled* by Wood, who had erroneously figured *ochrodactyla* as *migadactyla*, immediately concluded that Haworth's *migadactyla* referred to *ochrodactyla* also, and put it so in the *Catalog*. But this was impossible since Haworth had already distinguished *ochrodactyla* from *migadactyla*. This error led me to search the matter out and it is clear enough until Haworth is reached. But although I have been studying Continental "plumes" for many years, I do not set myself up as a critic of Continental species. Therefore I say "I have left entirely out of account the Fabrician *migadactyla*, as there may be a white Continental (*not British*) species, to which the description might apply, but that does not influence Haworth's use of the name for our species." Surely this is a fair and square statement of facts as far back as I can follow the subject. Now if Mr. Dale has any knowledge of Fabricius (personally or from books) and can become a critic behind that point where I leave off I shall be pleased to say that *migadactyla*, Haw. is *migadactyla*, Fab. On the face of the description alone I think it very probable, but (and this is the factor which deterred me from feeling certain that this was so) it is quite possible for a short diagnosis to comprise two or even more species, and be an equally good (or bad) description of either or each, and yet, from incompleteness or some other factor the differentiation of any one of the species may be impossible, and this I feel may be the case with the Fabrician description. When Haworth copies a previous description and exten... its application it appears to me common sense to suppose that he becomes responsible for its usage so far as he accepts it for his own species, *i.e.*, the one before him and of which he is writing and to assume otherwise would land us into endless muddle or difficulty. I may state that I myself gave Mr. Dale the clue on which he has based his paragraph *vide, ante* p. 8, where I write "*Fab.*" I cannot imagine otherwise that Mr. Dale would have known anything about the matter. One other point I would like to ask Mr. Dale. He says:—"Moreover he did not name and describe a species as *migadactylus*, but merely copied Fabricius." This is true as far as it goes but Haworth did describe a species under *migadactyla*, first quoting Fabricius' diagnosis and then further describing in his own words its relations to allied species, habitat etc. which Fabricius apparently did not know; and then he goes on to say "Moreover, he Haworth did not possess *spilodactylus*, Curt." Now if this be meant for a joke I must congratulate Mr. Dale on the depth of his wit, but if it be a genuine solid statement I would really ask Mr. Dale in what part of the Shades he meets the spirit of Mr. Haworth to discuss what the latter had in his collection at the beginning of the century. When our poetical friend last month in the pages of the *Record* suggested that the departed might do a little bug-catching on their own account I little knew that Mr. Dale had solved the mystery by being in spiritual communication with the late Mr. Haworth.—J. W. Tutt, March. 20th 1894.

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*This word "misled" is scored out.—Eds.

On Aciptilia Migadactyla.—I think Mr. Tutt owes me an apology for what he has last written, (*British Naturalist*, No. 4, p. 100). I certainly have had one advantage over him in having had an entomological father, who was well acquainted with Haworth, Curtis, Leach and other entomologists of former years. Mr. Haworth died in 1833, and his insects were sold by auction in 1834. A sale catalogue of his collection is before me as I write. The lot containing *Pterophorus migadactylus* was bought by my father, so that in stating Haworth did not posssess *Spilodactylus*, Curt., I stood on firmer ground than Mr. Tutt is now standing on. When moths have been on the wing for some time they fade and become paler than fresh specimens ; hence, in olden times, they were often described as distinct species. Mr. Tutt may be the *facile princeps* of living entomologists, but why should the opinions of Curtis, Stephens, Westwood, Doubleday, and Stainton be entirely ignored?—C. W. Dale, Glanville Wootton, April 22, 1894.

NOTES ON EARLY MAN: THE PLIOCENE PERIOD.

BY JOSEPH SMITH, F.R.S.A., M.R.I.A.

(Continued from page 86.)

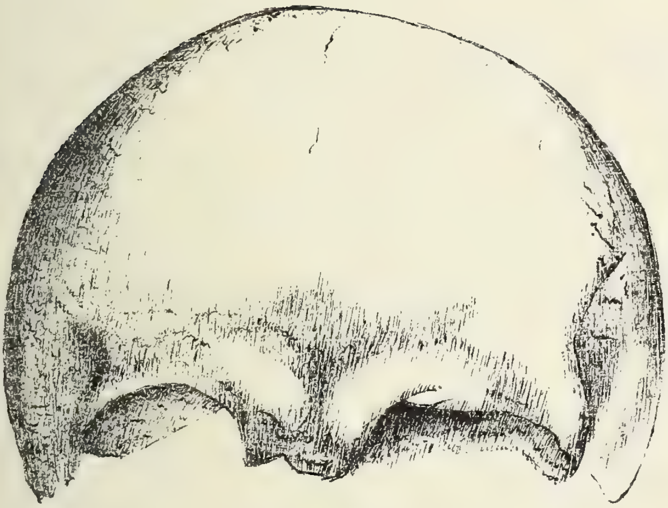
The size of the jaw and the front molars give the idea of great facial projection, or prognathism, but the general appearance of the jawbone—one of the canines being fractured—presents a very striking resemblance to the jawbone of a human being, for the chin line, far from being a retreating one indicative of the ape, is almost straight, having great affinity to the characteristics of the human remains which have been more recently brought to light.

Whether the being whose industry is shown in the Thenay flints was an anthropomorphous ape or a human being, there is not sufficient evidence to determine, and Roujou, who gave great attention to early man and his remains, was unwilling to stake any important hypothesis on an isolated discovery of *Dryopithecus* remains, which he considered in the interest of the science totally insufficient.

The Miocene age was followed by that epoch known to us as the Pliocene, or less recent, and our course of study naturally prompts us to inquire whether the human race existed during this period. Nothing in the way of material is there to assist us, and we are still left in doubt, although several discoveries have been made. Amongst

PLATE VI.

ENGIS SKULL.



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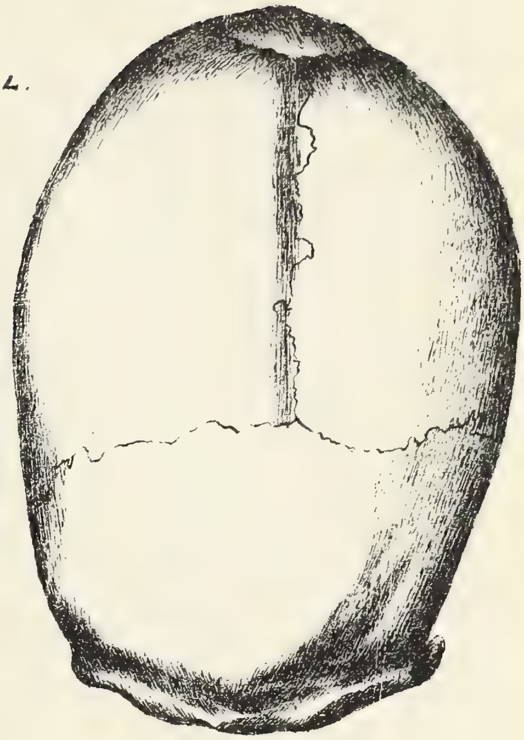
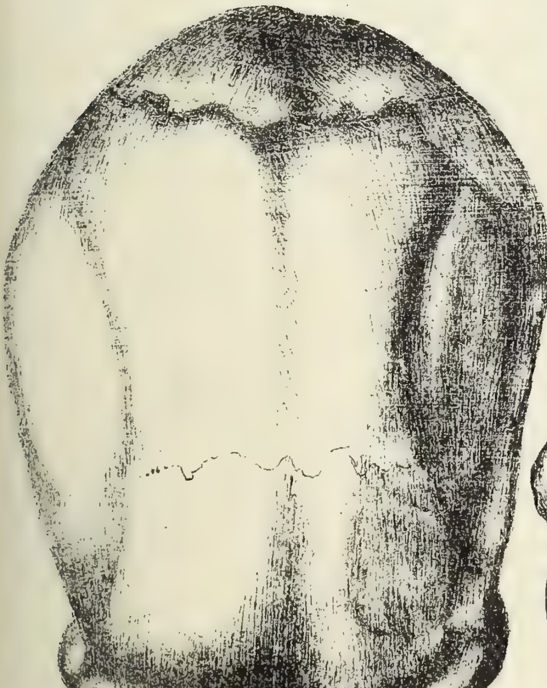


dome

NEANDERTHAL SKULL.



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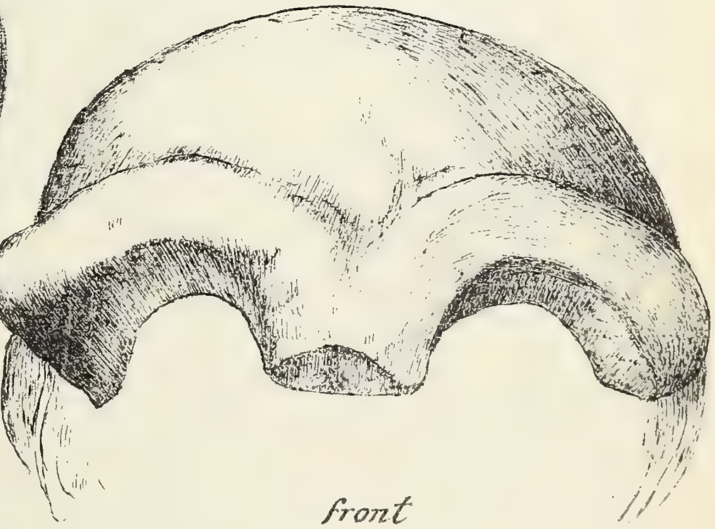

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PREHISTORIC SKULLS.

BRITISH MUSEUM
NATURAL HISTORY.

these the most significant was that of Whitney, who wrote to Desor that he had "discovered unquestionable proof on the coast of the Pacific Ocean of the existence of man anterior to the glacial epoch, and the age of the mastodon and elephant, during a period when the flora and fauna were entirely different to those of the present day." He also favoured Bourgeois with a similar intimation, and some years afterwards Whitney published an essay on the subject, the speculations in which, proving the existence of man in these early times, were freely endorsed by Desor. This essay was the means of directing a more critical attention to Whitney's discovery, and when the surroundings were thoroughly investigated the remains were pronounced to be recent, and those of an Esquimaux. Likewise an entire skeleton, which was found at a depth of three feet in a deposit of the Lower Pliocene period, and which remains were described by Issel, proved on examination to be the skeleton of a Ligurian of a date much later than the Pliocene age. We are not, therefore, at present able to pronounce satisfactorily on remains of the Pliocene period.

In the beds belonging to the latter part of this era bone fragments have been found showing striæ, or markings, but the circumstances of the finds, and the fewness of the fragments themselves, did not enable any satisfactory expression of opinion as to what the being was that had produced these incised markings.

Bourgeois, during the year 1866, was successful in discovering in the St. Prest beds in France a series of worked flints, which are considered as positive evidence of the existence of a human being. These flints have been sorted and tabulated as follows:—

Lance and arrow-heads,
Piercers,
Scrapers,
Hammers,

but Cartaillac seems to regard the origin of these flints as quite as doubtful as the markings on the bone fragments above referred to. It is generally accepted, however, that these flints do in no way offer any particular difficulty, but were the industry of one of those races of men, probably of that race traces of which have been met with in the early quaternary deposits. Capellini, during the meeting of Anthropologists held in 1876 at Buda-Pesth, exhibited bones from the Pliocene beds near Boulogne, which showed incised markings. These bones were the ribs of a small fossil whale, and he considered the markings, which are all on the convex side, to have been produced by man. From their position and appearance it was assumed these markings had been made with flint knives by those persons who had cut away the flesh of the whale as it lay on its side, and many eminent Italian naturalists, who have carefully examined the incised ribs, conclude from the character of the markings that they were undoubtedly produced by a *being* well acquainted with the use of a knife. Truly, indeed, may we endorse the assertion of Quatrefages that "Tertiary man is only known to us from the faint traces of his industry."

Certain geologists contend that the Pliocene period was closed by a series of glacial phenomena of great magnitude, which was coincident with that depression which isolated England, until then one with the Continent, and during which time there existed a fauna embracing the *Elephas Meridionalis*, the remains of which have been found in the Cromer deposits. This depression, it is argued, allowed a glacial sea to sweep all before it and swamp the half of the Russias, the whole of Prussia, and the greater part of Holland and England. Now, the course of this inundation is marked by the deposit of erratic blocks of Scandanavian origin brought down by the ice floes. This glacial period would be followed by a period of Continental warmth, which would on account of the depression and meeting of the glaciers give rise to a second period of cold, though of less intensity than the first.

Others regard the depression of land which marked the termination of the Tertiary age as being coincident with a period of mildness and humidity, but whatever was the course of geological events at the time, these contending sections are agreed that there did exist a period of warmth. This is the first part of the Quaternary period during which the waters of the various streams and rivers attained to a great height, and at the same time acquired a slower mean flow, thereby allowing the river deposits to accumulate quickly, and to fill in those erosions in the valleys which had been brought into existence during the preceding period; while in some instances alluvium beds twenty to thirty yards in thickness were laid on the banks, and deposited at the further ends of the valleys. Eventually, when in time greater space was given for the play of the waters, the flow became more rapid resulting in an action which was the reverse of the preceding, for in place of the silt and alluvium being deposited, the waters undermined those beds already formed, distributing and depositing them in the ledges and on the banks above the water line. These upper deposits are the earlier ones and belong to the same age as the lower alluvials of the valley beds. It is in both of these deposits the earliest known signs of human industry—worked flints—and the remains of the *Elephas antiquus* are found, and unlike those unearthed from the beds of the Tertiary age, there exists no doubt as to the origin of their shape. It is well that man does effectually establish his identity at the commencement of the Quaternary epoch, and has left abundant and indisputable traces of himself, lest certain geologists, unwilling to recognize evidences less stubborn, might be inclined to name this early part of the Quaternary age the *anthropozoic epoch*.

(*To be continued.*)

SUGARING NOTES.

(*Continued from Old Series, Vol. III., p. 212.*)

YORK.—1st July, 1893.

Askham Bog; wind N.W.; obscured, dry, quite warm and close. Took 1 *G. papilionaria* at rest about 10.45 p.m. At sugar I found *O. suspecta* common, *N. baja*, 2, *brunnea* several, *T. pronuba*, *L. pallens*, and *impura* common, *N. c-nigrum* 1, *augur*, *X. polyodon*, *H. oleracea*, *A. gemma*, and *M. strigilis*, var. *Æthiops*, several; *A. leporina* 1, female, which gave me 40 eggs; *M. fasciuncula* 2, *C. sparsata* 2, and *B. repandata* common.—W. Hewett.

YORK.—7th July, 1893.

Askham Bog; wind, N.W., slight, sky obscured, dry, night warm. I went round the sugar twice, and found *O. suspecta* abundant, 6 or 7 on a patch; *N. festiva* 1, *brunnea* several, *T. pronuba* abundant and very variable; *X. polyodon*, *M. strigilis*, var. *Æthiops*, several; *A. oculea* common, *E. apiciaria* 1, *A. bisetata*, *C. pyraliata* several, *C. sparsata* was common on the wing, though getting passé, 1 *G. papilionaria*, taken on wing, about 10.50.—ID.

YORK.—17th July, 1893.

Askham Bog; wind N., strong; clear, dry. Had been showery during day, but cleared up at night. I took *B. perla* in cop, about 8 p.m., on a brick wall. At sugar I found *O. suspecta* fairly common, *X. polyodon* several, *C. trapezina* 2, *A. oculea* common and very variable, *L. pallens* several, *M. strigilis*, var. *Æthiops*, 1; *A. aversata* 1, *C. immanata* and *pyraliata* several, *E. viminalis* 1, *Y. elutata* 1. There was nothing on the wing.—ID.

YORK.—20th July, 1893.

Askham Bog; wind N.W., obscured, dry. At sugar: *O. suspecta* several, but getting worn; *C. trapezina* 3, *A. oculea* 4, *N. baja* common, *X. polyodon* common (1 black); *T. pronuba* common, *C. immanata* 4, *Y. elutata* 2. Took 1 *G. papilionaria* at about 9.50 p.m.; nothing else on the wing.—ID.

YORK.—22nd July, 1893.

Askham Bog; wind N.E., obscured, dry. *Geometræ* common on wing; *C. immanata* and *C. testata* plentiful, also a few *Y. elutata*, *E. apiciaria*, *A. bisetata*, *M. rubiginata*, and *L. didymata*. At sugar *N. baja* common, *C. trapezina* common, *A. oculea* common, and very variable; *T. pronuba*, *X. polyodon* several (1 black); *O. suspecta* several, mostly worn; *M. strigilis*, var. *Æthiops*, 1; *A. bisetata* 1, *aversata* 2, *Y. elutata* and *C. immanata* several.—ID.

York.—24th July, 1893.

Askham Bog; wind N.W., obscured, damp, warm. At sugar: *C. trapezina* common, *N. baja* several, *O. suspecta* 7, *A. oculea* 3, *T. pronuba* several, *Orbona* 1, *N. plecta* 1, *L. pallens* 2, *X. polyodon* several, *C. immanata* several. Heavy showers fell about 7.15 and 9 p.m.—Id.

York.—25th July, 1893.

Askham Bog; wind N.W., obscured, dry. On this occasion I sugared 465 birch trees. Results:—*O. suspecta* several, *C. trapezina* common, *A. oculea* several, *X. polyodon* 2, *N. baja* several, *T. pronuba* common, *Orbona* 1, *C. immanata* 5. I took 1 *C. elinguaria* at rest on the roadside.—Id.

York.—26th July, 1893.

Sandburn Wood, about 6 miles from York; wind S.W., obscured, dry, and to-night I sugared principally oak trees, and found *O. suspecta* common, *C. trapezina* common, *N. baja* and *brunnea* several, *A. nigricans* 3, *M. literosa* 1, *T. fimbria* 3, *C. duplaris* 1, *T. pronuba* and *X. polyodon* several, *A. aversata* 1. On the wing I took a few *Y. elutata*, *C. immanata*, 1 *B. repandata* and 1 *G. papilionaria*, very worn.—Id.

York.—28th July, 1893.

Askham Bog; wind N.W. Sugared 465 trees, principally birch, but very little came, the results being *A. oculea* 5, *X. polyodon* 2, worn; *N. baja* common, but worn; *T. pronuba* common, *Orbona* 1, *C. trapezina* common, *O. suspecta* 6 (only one fine); *C. immanata* 5.—Id.

Aberdeenshire.—1st August, 1893.

Wood at Moneymusk; light, variable breezes, sky obscured, dry. I got at flowers 2 *Myellus*, 22 *Sobrina* 1, *Neglecta* 3, var. *Castanea*, 2 *Nigricans*, *Festiva*, *Baja*, *Impura*, *Pallens*, *Pronuba*, *Orbona*, *Testata*, *Populata*, *Cæsiata*, and *Munitata*. Only a few *Polyodon* turned up at sugar from 9.30 to 12 midnight.—A. Horne, Aberdeen.

Marlborough.—1st August, 1893.

Wood; wind W., moderate; obscured, drizzling rain, warm air. *N. depuncta* 1, *A. pyramidea* 1, *A. nigricans* 3, *T. pronuba* 4, *N. baja* 2, *A. oculea* 2, *T. orbona* 1, *C. trapezina* 3, *L. lithargyria* 1—total observed, 18.—H. S. May, Marlborough.

Kincardineshire.—2nd August, 1893.

Coast at Bay of Nigg; wind E., light, cloudy, slight showers throughout the evening. I only got 2 *Lucernea* on heather; the rain appeared to have spoiled the attractiveness of the bloom. At sugar on palings I took *Furva* 30, *Tritici* 6, *Literosa* 3, *Fasciuncula* 2, *Testacea* 1, *Nigricans*, *Conigera*, *Pronuba*, and *Orbona*, all common; *Polyodon*, *Xanthographa*, and *Oculea* abundant.—A. Horne, Aberdeen.

MARLBOROUGH.—2nd August, 1893.

Wood; wind N.W., rather strong; clear, dry. At sugar: *L. lithargyria* 1, *C. trapezina* 8, *N. depuncta* 5, *Baja* 3, *C. ailuta* 1, *A. pyramidea* 2, *T. pronuba* 8, *A. suffusa* 3, *Nigricans* 4, *Segetum* 3, *X. polyodon* 1, *C. cytherea* 1, *A. oculea* 4, *M. strigilis* 2, *T. orbona* 1—total observed, 47.—H. S. May, Marlborough.

WIMBLEDON COMMON.—2nd August, 1893.

Wood on the Common; wind W., light clear, fairly dry, but dewy. At sugar, *Pronuba* several, *Cytherea* 7, *Baja*, *Oculea*, *Polyodon*, and *Trapezina*, in swarms; *Puta* 3, *N. rubi* many, *Pyramidea* 3, *Impura* and *M. brassicæ* a few. There were also a few *Rhomboidaria*, *Eupitheciæ*, and *Micros* at the sugar.—E. H. Taylor, Fulham.

BRIDESTOWE, DEVON.—2nd August, 1893.

Wood; wind S.; dark, damp; apparently a good night as far as necessary conditions go, but results poor, viz.:—*A. rumicis* 10, *A. pyramidea* 4, *A. typica* 1, *T. orbona* and *pronuba* numerous.—Major Still, Bridestowe.

ABERDEENSHIRE.—3rd August, 1893.

Mixed wood at Moneymusk; wind, N.W.; cold, clear, moon shining brightly; thunderstorm and heavy rain during afternoon, dry in evening. I captured 1 *Sobrina* only, a few very common things at flowers, not any *Sobrina* as on 1st inst. At sugar a few each of *Polyodon*, *Baja*, *Festiva*, and *Pronuba*—A. Horne, Aberdeen.

REPORTS OF SOCIETIES.

ENTOMOLOGICAL SOCIETY OF LONDON.

March 28th, 1894.—Henry John Elwes, Esq., F.L.S., President, in the chair. Mr. Percy H. Grimshaw, of 58, Coniston Road, Edinburgh, was elected a Fellow of the Society. Mr. McLachlan announced the sudden death, on the 23rd inst., of Mr. J. Jenner Weir, who joined the Society in 1845, and had been one of its most regular attendants. He also commented on the scientific attainments of the deceased and his social qualities. Mr. Goss and Mr. Merrifield also spoke of their long friendship with the deceased, and of the respect and esteem which they entertained for his varied knowledge and amiability of disposition. Mr. W. Borrer, jun., exhibited a wasps' nest, which had been built in such a way as to conceal the entrance thereto and to protect the whole nest from observation. He believed the nest to be that of *Vespa vulgaris* (*cf.* Proc. Ent. Soc. London, 1892, pp. xx. and xxi.). Mr. McLachlan and Mr. Blandford made some remarks on the subject. Mr. G. F. Hampson exhibited a specimen of *Gaudaritis flavata*, Moore, from the Khári Hills, and called attention to the existence in the males of this species, in the closely allied British species *Cidaria dotata*, Linn., and also in two Japanese species (*C. agnes*, Butl., and an undescribed species), of an organ on the under side of the fore wing, which he suggested might be for stridulation ; this organ consisting of a small scar of hyaline membrane situated just below the middle of vein 2, which is much curved : this scar is fringed with long hair, and has running down its middle a row of sharp spines situated on the aborted remains of vein 1, and which is curved up close to vein 2 ; the spines would naturally rub against part of the costa of the hind wing, but no spines or unusual roughening seem to exist on that or on any of the veins on the upper side of hind wing against which they could strike ; below the scar is situated a large shallow fovea or pit in the membrane, slightly developed in *dotata* and *flavata*, but much more prominently in the two Japanese species, and, should the organ prove to be for stridulation, would probably act as a sounding-board. Mr. Hampson said that in the Japanese species *C. fixreni* of Brem, exceedingly closely allied to *flavata*, the males have no trace of this organ ; and he hoped that entomologists who have an opportunity of observing *dotata* in life would make some experiments on living specimens during the ensuing summer ; probably confining males and females together would lead to some results. The President, Prof. E. B. Poulton, Lord Walsingham, and Mr. Hampson took part in the discussion which ensued. The Rev. T. A. Marshall communicated a paper entitled "A Monograph of the British Braconidæ, Part V." Mons. Louis Péringuey communicated a paper entitled "Descriptions of new Cicindelidæ from Mashonaland." Prof. Poulton gave an account of his recent tour in the United States, and commented on the entomological and other collections contained in the American museums. Lord Walsingham, Mr. Hampson, and the President also made some remarks on the subject.—H. Goss, Hon. Secretary.

April 11th, 1894.—Henry John Elwes, Esq., F.L.S., President, in the chair. Mr. F. W. Jones, of 63, Carlton Hill, St. John's Wood, N.W., and Dr. William Steer Riding, B.A., M.D., of Buckerell, Honiton, Devon, were elected Fellows of the Society. The Hon. Walter Rothschild exhibited male and female specimens of *Ornithoptera paradisea*, Stdgr., from Finisterre Mountains, New Guinea ; *O. trojana*, Stdgr., from Palawan ; *O. andromache*, Stdgr., from Kina Balü, Borneo ; *Œnetus mirabilis*, Rothsch., from Cedar Bay, Queensland ; and a few other splendid species from the Upper Amazons. The President, Mr. J. J. Walker, Mr. Osbert Salvin, Lord Walsingham, Colonel Lang, Mr. Champion, and Mr. Hampson made remarks on the geographical distribution of some of the species and the elevation at which they were taken. Mr. H. Goss exhibited for Mr. G. A. J. Rothney, several specimens of a species of Hemiptera (*Serinetha augur*, Fab.), and of a species of Lepidoptera (*Phauda flammans*, Walk.), the latter of which closely resembled and mimicked the former. He said that Mr. Rothney had found both species abundantly on the roots and trunks of trees in Mysore, in November last, in company with Ants (several species of *Camponotus* and *Cremastogaster*). The Hemiptera appeared to be distasteful to the Ants, as they were never molested by them, and he thought that the species of Lepidoptera was undoubtedly protected from attack by its close imitation of the Hemipteron. Mr. Goss said he was indebted to Mr. C. J. Gahan for determining the species. A discussion followed on the mimicking species, in which the President, Mr. Waterhouse, Mr. J. J. Walker, Colonel Swinhoe, Mr. Hampson, and others took part. Mr. J. W. Tutt exhibited (1) a typical specimen of *Lycæna corydon*, captured in July, 1893 ; (2) a hybrid male (*L. corydon* and *L. adonis*), taken *in cop* with a typical female *L. adonis*, May 20th, 1893 ; (3) a typical male *L. adonis*, May 20th, 1893 ; (4) a female *L. adonis*, the pigment failing in one hind wing ; (5) a pale var. of *L. corydon*, probably to be referred to var. *apennina* of Zeller, usually taken in Italian mountains, or var. *albicans*, H.S., taken in Andalusia. Mr. Tutt remarked that, of the first, Staudinger (Cat. p. 12) says "pallidior," of the latter "albicans." He also remarked that the hybrid retains the external features of the species *corydon*, but has taken on to a great extent the colouration of *L. adonis*. It was captured *in cop* with a female *L. adonis*, at a time when *L. adonis* was very abundant, and some weeks before *L. corydon* occurred (*vide* Ent. Record, iv., p. 230). The question having been raised by the President as to the number of meetings of the Society which it was desirable to hold during the year, and the most convenient dates for such meetings, a long discussion on the subject ensued, in which Mr. Waterhouse, Mr. Salvin, the Hon. Walter Rothschild, the Rev. T. Wood, Mr. S. Stevens, the Rev. J. S. St. John, and others took part.—H. Goss, Hon. Secretary.

MANCHESTER CONCHOLOGICAL SOCIETY.

ALBINISM IN MOLLUSCA: FINDS IN THE MARPLE CANAL.

At the last monthly meeting of the Manchester Conchological Society, held at Owens College, Mr. Thomas Rogers in the chair, Mr. K. Hurlstone Jones read an interesting paper upon Albinism in Mollusca, and the Tendency to the Phenomenon in 1893. He said albinism may be briefly stated to be lack of colour, and is really an abnormality. The eye of an albino is proverbially pink, due to the blood vessels being plainly visible through the transparent iris. Were any pigment present such vessels would be obscured by it, and the eye would appear white. It is true that there are albino species—instance the white rat, mouse, ferret, and rabbit—but these are merely artificial propagations of abnormality by man. There are also many white animals, such as the polar bear, and numerous birds, but these are not albinos. The polar bear has brown eyes, black claws, and the mucous membrane lining the lips is of a similar colour. Some animals are white at one season of the year and brown at another, as the Ptarmigan and Alpine hare, but are not true albinos. Many species of mollusca occasionally produce a white or transparent white shell, which conchologists recognize as an albino; but a mollusc bearing such a shell presents a paradox, for, whilst the shell may be perfectly colourless, the animal is always more or less pigmented, in fact, the albino mollusc is in precisely the same position as the polar bear, and practically, what is usually considered an albino mollusc is not an albino at all. There are also shells which are partly albino and partly typical in colour. *Planorbis corneus*, taken from a pond at Birch, were partly white and partly brown, as if the collar had been unable at some parts to produce the colouring material through some constitutional deficiency in such parts. Similar cases occur among terrestrial mollusca, and it is more likely that these changes are due to some constitutional change in the animals themselves, than to some loss in food material as has been suggested; for if the latter were the case we should expect to find a colony of the animal presenting the above remarkable features. Food does, however, have considerable influence on colouration, as has been experimentally proved by transporting an animal from its native habitat, and feeding it upon something different to what it would procure in a state of nature. Brown *Helix nemoralis* fed upon cabbage leaves completed the shell of a yellow colour. Obviously something was wanting in the food, for this peculiarity was not confined to one or two individuals, but was common to the whole brood. It may be urged that a similar explanation will suffice for those specimens which have been captured at large presenting the same features, but this can hardly be, for the animals do not wander far except to search for food. White shells are taken either singly or in large colonies. At Birch there is a pond in which the white variety of *Planorbis corneus* occurs in such quantity that last year the number was greater than the type, being as much as seventy-three per cent. of the total, and a similar tendency to form colonies has been remarked amongst land shells. Probably these colonies have come into existence by the accidental production of several albinos, which have chanced to interbreed, and so propagated the variety. He described the structure and colouration of the shell in molluscs at length, and exhibited a large number of albino specimens taken by himself and members of the Society during last year. and up to the present time in various parts of Great Britain, which seemed to point to the unusual prevalence of white varieties during that period.

Mr. R. Standen exhibited a fine set of *Unio pictorum*, and *U. tumidus* from the Marple canal. and gave a description of an excursion to that locality in company with some other members on Good Friday last. The water having been drawn off all along the canal locks, a grand opportunity was afforded of exploring the muddy bottom of the canal, which was found to team with mollusca, and a good haul was made. *Anodonta anatina*, *Paludina vivipara*, and many specimens of Sphærium and Pisidium were obtained. Very young fry of Anodonta and Unio were taken, and considered a prize, the young forms of these shells being rare in collections, but were on this occasion found abundantly. He also exhibited a number of very beautiful pearls found in the Unios he had taken home. The day being very dry, not many land shells were bagged, but the great event of the day was the taking of *Helix fusca* by several members of the party. This is a new addition to the Marple list, and, singularly enough, the shell was found to be well distributed over ground which has been thoroughly worked again and again by the Society during previous excursions, the wood where it was found being a favourite hunting ground. A number of Marple shells were also shown by Mr. Thomas Sparkes, Mr. Jones, and Mr. R. Cairns.

Mr. Charles Oldham exhibited, and presented to the Society's cabinet, a fine series of locality sets of Clausilia, Bulimus, Pisidia, and other British species, for which thanks were voted.

Dr. G. W. Chaster exhibited *Philene nitida* from Southport ; and Mr. W. Moss various rarities from Trinidad and Borneo.

HERTS NATURAL HISTORY SOCIETY.

At the last meeting of this Society, Mr. A. E. Gibbs read a paper, entitled "The Wasp Infestation of Last Year." The paper was both interesting and practical, embodying information derived from friends and correspondents in various parts of the county. All Mr. Gibbs's correspondents agree that wasps were exceptionally numerous during 1893, and that great damage was inflicted on the fruit crops. The reports of several of Mr. Gibbs's friends are briefly summarized:—Mr. H. Lewis, of St. Albans, records the partiality of the wasps for Victoria plums; "those left on the trees were quite spoilt, and when we attempted to gather the fruit we found only the skins left ; the rest were in nearly every case full of wasps." Mr. Nutting, of Childwickbury, also experienced and suffered from the wasps' liking for plums. He says "They usually cut into the fruit a short distance from the stem, on what might be called the shoulder, and clean it out thoroughly, leaving only the bare skin. I have taken out 20, and sometimes more, from a single fruit ; they seem to get intoxicated." Mr. A. Smith, of Smallford, gathered his plums before they were ripe and bottled them, but the wasps revenged themselves by devouring his apples. "In a small orchard of about a dozen trees I should think there were quite twelve bushels of apples completely eaten, besides those which were commenced." Mr. R. Shillitoe, of Bancroft, Hitchin, notes several interesting facts in connection with the hibernation of wasps. "Instead of hibernating in solitary state under the bark of trees, &c., they appear to have swarmed together this year in large numbers. In a heap of stones . . . large numbers were found. They had simply crept into the interstices, and there established themselves for the winter." In another place about 200 "had evidently passed through the severe frosty weather that we had about Christmas on the top of the roof, with no other protection than a piece of canvas. If queen wasps are capable of hibernating under such circumstances and in such numbers, I am afraid we are likely to have a greater wasp plague than ever next year." Mr. Gibbs, while recording Mr. Shillitoe's observations, properly dissents from his use of the word swarmed; he considers that the queens "took possession of their winter quarters singly and not *en masse.*" As to means of destruction, several of Mr. Gibbs's correspondents recommend cyanide of potassium; but Mr. Nutting, having tried that and several other methods, says "the most effective and least dangerous is gas tar." It should be poured both into the hole and on the soil around the entrance.

LANCASHIRE AND CHESHIRE ENTOMOLOGICAL SOCIETY.

The last meeting of the winter session, April 9th, the President (Mr. S. J. Capper, F.L.S., F.E.S.) in the chair. The following papers were read:—"Lepidoptera of Prescot," by the Rev. R. Freeman; "A note on Aculeate Hymenoptera and Diurnal Lepidoptera during March, 1894," by Mr. Willoughby Gardner, F.R.G.S., and "Ammophila lutaria," by Mr. C. E. Stott. The papers were all illustrated by specimens. Reports of the additions to the lists of the insect fauna of Lancashire and Cheshire for the years 1891-2-3 were read as follows:—Coleoptera and Hemiptera-heteroptera, by Mr. W. E. Sharp; Hymenoptera, by Mr. Willoughby Gardner; and Lepidoptera, by Messrs. Capper and Pierce. The lists showed that many important additions had been made to these lists, and that steady work was being done in the neglected orders. Mr. Jones exhibited a number of Tæniocampa taken at sallows from Llangollen; Mr. Crabtree, Callimorpha hera and eight varieties of Zygæna filipendulæ; Miss Tomlin, of Chester, a number of Hymenoptera from Madras; the Rev. Mr. Freeman, Rhopalocera from N.W. India; and Mr. Sharp, a collection of local Hemiptera-heteroptera.—F. N. PIERCE, Hon. Sec.

THE SOUTH LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY.

12th April, E. Step, Esq., President, in the chair.

The President referred to the great loss the Society had sustained by the death of Mr. J. Jenner Weir, who had always taken such an active interest in its meetings, and a resolution was unanimously adopted that a letter of condolence and sympathy should be sent to Mrs. Weir.

Mr. Carpenter exhibited long series of *Hybernia leucophearia*, Schiff, from Coombe Wood, West Wickham, and the New Forest, showing the typical forms in each place, also ova of *Trachea piniperda*, Panz.

Mr. Adkin, for Mr. Billups, the following rare Diptera:—*Meigenia majascula*, from Dulwich, new to Britain; *Sciomyza rufiventris*, from Ireland; *Degeeria pulchella*, bred from *Peronea maccana*, by Mr. Adkin; *Urellia eluta*, from Lewisham, and an unknown species of the genus *Phorbia*; also galls of *Dryophanta divisa* and their maker, with *Synurgus albipes*, one of its Inquilines and five parasites, viz., *Mesopolobus fasciventris*, *Syntomaspis caudatus*, *Upelmus urozonus*, *Decatoma biguttata*, and a *Chalcid*.

Mr. Adkin, a drawer, showing series of the genus *Noctua* from various localities, especially *N. glareosa*, Esp., and *N. augur*, Fb.; also, on behalf of Miss E. Adkin, a bloom of *Tulipa sylvestris*, L., from an old chalk pit in Suffolk.

Mr. Moore and Mr. Perks, wood, which had been destroyed by Coleoptera.

Mr. C. A. Briggs, a number of very striking varieties of *Abraxas grossulariata*, L., similar to those figured in "Newman," and "The Young Naturalist," Vol. I.

Mr. Jager, a living *Biston hirtaria*, Clerk., stating that he had met with a considerable number of cripples, all malformed on the right side.

Mr. Step, a specimen of the Fungus, *Morchella æsculenta*, L., received from Wotton-under-Edge.

A communication was read from Mr. Adye, on the early season in the New Forest, Messrs. Step, Adkin, Carpenter, and others taking part in the discussion which followed.

The President gave an interesting account of a curious habit of some ducks in killing toads during the breeding season, by dexterously slitting their abdomens.

Thursday, April 26th, E. Step, Esq , President, in the chair.

The Rev. M. Corden Jones and Mr. Francis Fell were elected members.

Mr. Dennis exhibited a bred variety of *Pararge egeria*, L., having all the light markings much extended.

Mr. Routledge, a series of *Miselia oxyacanthæ*, L., taken by Mr. Beaumont.

Mr. Auld, a series of *Tæniocampa munda*, Esp., with several examples of var. *immaculata*, Stgr., taken at West Wickham; also a series of *T. populeti*, Fb., taken at Westerham.

Mr. Enoch then gave his paper entitled, "Notes on Common Insects," and illustrated it by about fifty slides, shown with the oxy-hydrogen lantern. The paper dealt largely with common pests and their parasites, such as the Sycamore Aphis with its numerous enemies, the Currant Mite, the Sawfly of the willow with the insects which attack its larva, the flies whose larvæ mine the Marguerite plant, the parasites of the Hessian Fly, and last but not the least beautiful, examples of the minute Fairy Flies, of which he stated he possessed at least one hundred and fifty species. He laid considerable stress upon the economic side of the subject, and strongly advocated following the example set by the United States Government in having an Entomological Section attached to the Agricultural Department. Most of the information given was the result of original observations, and unobtainable in any book. The admirable manner in which the interesting and peculiar life histories of these minute creatures were portrayed upon the screen, and described, excited the greatest admiration among the large number of members and friends present.

After a few remarks from the Chairman on the kindness shown by Mr. Enoch in coming to both entertain and instruct us, Mr. Barrett proposed, and Mr. Auld seconded, a hearty vote of thanks to Mr. Enoch, which was unanimously passed. In reply, Mr. Enoch said that at present he saw no chance of either the farmers or the Government taking up the matter of Economic Entomology, and he considered both were culpably ignorant.—HY. J. TURNER (Hon. Report Secretary).

LINNEAN SOCIETY.

At the meeting of the Linnean Society held at the Society's Rooms on May 3rd, Professor Poulton, M.A., of Oxford, showed a series of interesting lantern slides, illustrative of some experiments he had been conducting to show the change of colouring which certain lepidopterous larvæ are capable of assuming for protective purposes. Several questions were asked, and Mr. A. E. Gibbs, F.E.S., detailed the results of feeding the larvæ of *Amphidasys betularia* on birch, which has brown shining stems, and on acacia, the petals of which are of a green colour, the larvæ in one case becoming brown and in the other case green. Mr. James Saunders, of Luton, showed by means of the lantern, a photograph of the plasmodium of a mycetozoa, and in an interesting speech explained the exhibit. A vote of thanks was accorded to the exhibitors.

NOTES ON SOME EARLY FRUIT PESTS.

F. V. THEOBALD, M.A., F.E.S.

With the extremely forward spring has come a very early appearance of many insects, notably the plant lice (Aphidæ). On March 22nd, I found a large number of the Plum Aphis (*A. pruni*) upon the opening buds of the plum and apricot. By the time the leaves and blossoms were fully out *Aphis pruni* literally swarmed over them. The young leaves became at once curled and shrivelled, and the blossom itself was also attacked, a somewhat unusual occurrence. Generally this fruit louse does not appear until after the bloom is set, and even then often does much mischief, sometimes entirely spoiling what little fruit forms, by their black excreta and gummy honey dew. This year I am afraid in many places they will materially affect the formation of the fruit, if they continue to increase at the present rate. The first generation that makes its appearance in the spring is the apterous viviparous female, which are at first pale yellowish green, but later become darker, with dark mottlings and a dark dorsal stripe ; some specimens become almost brown in hue. During the present spring I noticed they gave rise to living young with extraordinary rapidity. Two isolated females (wingless) from the 1st to 18th of April, produced no less than 107 young. I only followed the reproduction by one of these second generation, and this I found bred with equal rapidity after ten days. This rate of increase, although greater than usual for this time of year, is nothing compared to later in the season and in other species. Prof. Webster (U.S.A.) sends me a paper in which he records that one wingless female of the Apple Louse in 21 days gave rise to 89 young ! For the last ten years certain greengage and plum trees at my home (Kingston-on-Thames) have suffered more or less from this blight, in spite of various methods of *prevention*, by way of destroying the ova, which the oviparous females deposit upon the stem and twigs in the autumn. I find this year that by spraying the trees with an emulsion of paraffin or kerosene, just before the buds burst (that is about the time when many of the ova are ready to hatch), many of the embryos are destroyed. I learn from correspondents that this aphis is very abundant in many parts of the country, and already it may have done much harm. The pupal form generally makes its appearance about May. The pupæ are very much like the wingless females, but if they are carefully noted, rudiments of wings are found on each side, and there are yellow markings upon the upper side of the body. The pupal form gives rise in the summer to the second or winged-female, which is pale yellowish-green, with the prothorax and three thoracic lobes dark green, and with dark green markings on the abdomen ; the wings are hyaline and delicate, and have green stigma, cubitus and insertions. Towards autumn true males are produced ; they are likewise winged, but are yellowish-brown in colour. Miss Ormerod says the males may appear in November, but I have never seen them so late ; as a rule, the latter end of September and October are the times they appear. About this time also the last form of female, namely, the oviparous wingless creature, is developed.

This oviparous female is somewhat smaller than the first form and darker in colour. This oviparous generation pair with the winged males, and during the autumn deposit their black ova upon the twigs and stem of the plum trees. Whilst digging during the winter at the roots of the infested plum trees referred to, I came across several of the wingless females hibernating in the soil, but whether these had sprung from the autumn ova, or were the offsprings of the summer broods, I cannot say, but I believe that in this and many other Aphides some of the ova hatch during the late autumn, and the imagines coming from them hibernate at the roots of the plants they infest. During April a large number of forms have already assumed the pupal state, so we shall have the winged females ready to pass from tree to tree and orchard to orchard long before their normal time.

From several localities I also hear that the Currant Aphis *(Myzus ribis)* is very plentiful, and I have observed it myself in exceptional numbers at Kingston and Cambridge, both upon red and black currant bushes. As a rule, I note this plant louse appears about the first week in May; this season I found many upon the young leaves as early as April 1st. The wingless female is pale green, spotted with dark green, and somewhat elongate in form, with curious capitate hairs in front; legs yellow or green, and eyes reddish brown. The winged female, which is of a bright greenish-yellow, is marked with black and dark green, with black meso- and meta-thorax, and pale prothorax; legs yellow and brown. The male I have not seen, but Buckton figures it; it is somewhat smaller than the female, and yellow with dark markings. The wingless oviparous female is darker than the viviparous queen, and appears late in the autumn. After having paired with the male she lays her long eggs under the thin outer rind of the bark, attached to it by a gummy fluid. Many I find are laid in the rough knots and burrs of the red currant. It is generally noticed that when this plant louse is upon the currant bushes the leaves become covered with red and brown blister-like patches. These swollen cavities are the work of the Currant Aphis; by means of their beak they puncture and irritate the tissues of the leaf, and so cause these gall-like swellings. Every now and then the galls, instead of having the smooth red appearance generally seen, become covered with a mass of green moss-like matter, especially noticeable when the "lice" are very abundant. I find in this pest, which is entirely destroying the leafage in some parts of the country this year, that the pupal form has become abundant during the last few days. Another common Currant Louse (*Rhopalosiphum ribis*, Linn.) is also very abundant, and must not be confounded with the *Myzus.* Two other fruit pests have been notified to me as being of a very injurious nature this spring, in parts of Kent, Surrey, Cambridgeshire, and Somersetshire, namely, the larvæ of the Winter Moth (*C. brumata*) and the larvæ of the Currant and Gooseberry Sawfly (*N. ribesii*). The former has been very active amongst the leafage and blossoms of the apple already. From Horsmonden, in Kent, and from S. Devon I have notes of swarms of two of the Bibionidæ, namely *B. marci* and *B. anglicus* (Verrall). A correspondent in Kent writes: "The small black flies (*B. anglicus*) swarm here now (April 22nd), especially on the currant and gooseberry bushes." Although the larvæ feed upon various roots, I do not fancy they will prove of an injurious nature unless to grass lawns and delicate herbage.

COLEOPTERA.

Sphodrus Leucophthalmus.—I note Mr. Beck's report *re* this species in the April number of *The British Naturalist—vide 98.* In September of (I believe) the year 1889, I found a fine specimen of this species in a "beetle trap," which I had set in my late residence in Warrington, but saw no more that season. Knowing that the species was by no means common, I kept a sharp look-out for it during the two following years, with the result that from first to last I obtained about twenty specimens, mostly females, in the same manner. On more than one occasion I was so fortunate as to secure two specimens at a time. As a rule I found them most plentiful in August and September, but have met with them as early as May. As most Coleopterists will be aware, this fine species is peculiar in having, in the male only, the posterior coxæ produced into a spine, more or less variable in length and acuteness. The use of it I cannot divine, unless it serves something the same purpose as the inflated anterior tibiæ in Dytiscus, and other allied genera. Not having any collection of my own as such, the specimens I took have been distributed among sundry entomological collections with the exception of three or four; these are at the service of any Coleopterists requiring them as far as they go. One of them is of a reddish colour, a circumstance I at first ascribed to variation, but have since concluded that it had when killed not long before emerged from the pupa state, and had not time to acquire the normal colour. I shall be glad if Coleopterists will express an opinion as to how far I am correct in my conjecture on this point. Another strange circumstance remains a mystery; although I lived in the same house for twelve and a half years, yet during the first ten I never observed a single specimen of this beetle. It might be that, my attention not having been aroused to their presence, I may have overlooked them amongst a lot of cockroaches. It never occurred to me, however, to suppose my house was "a special locality" for this species. Having left the premises since December, 1891, I am not in a position to procure any more. While writing of this species, I may remark that the specific name *leucophthalmus* signifies *white-eyed*. All the specimens I took had *black* or at least *dark eyes*, whereas till I was able to replace the species in our local museum it was represented only by a single very old specimen, much the worse for wear, but which had *white eyes*. These latter, however, bore the appearance of having *become* discoloured by age, or by the action of corrosive sublimate used to preserve the specimens from mites, &c., and not from any natural cause. Can anyone say if they do possess *white eyes*?—B. KENDRICK, Stockton Heath, Warrington.

HYMENOPTERA.

ACULEATE HYMENOPTERA, TAKEN DURING MARCH, 1894.—March of this year, like that of 1893, has been abnormally fine and warm, with the result that many sun-loving insects have been upon the wing. Aculeate Hymenoptera have been astir very soon this season. Hive bees were busy collecting honey from apricot, pyrus japonica, &c., in February. Early in March another loud-buzzing species joined in the feast on the blossoms, viz., *Anthophora pilipes*—first the handsome male, with its elegantly plumed forelegs, and then the black female, not at all like her mate, and often mistaken for a Bumble Bee.

Every now and then the deep booming hum of one of the true Bumble Bees was heard in the air, and in the course of the month I took three species, viz., *Bombus terrestris*, *B. pratorum*, and *B. muscorum*. Then when the sallow's bloom and herbaceous flowers began to be more abundant, the short tongued *Andrenidæ* appeared upon the scene, and could be easily detected among their noisy companions on the blossoms by their silent flight. Before the end of the month I took *Andrena albicans*, male, *Andrena nigroœnea*, male and female, and *Halictus rubicundus*, both pretty insects.

On the sand hills at Hoylake, Cheshire, our local *Colletes cunicularia* also early made its appearance—the males; the females did not emerge till quite the close of the month.

Of Wasps, the hibernated females were of course the only specimens on the wing; of these I met with the three common species, *Vespa germanica*, *V. vulgaris*, and *V. sylvestris*. This makes a record of eleven species for the month of March, 1894, a number which is seldom attained so early in the year.—W. GARDNER, F.R.G.S., Liverpool.

MYRIAPODA.

NOTE ON THE MARINE CENTIPEDE.—I have lately received from Messrs. Sinel and Hornel, of Jersey, a specimen of the above which has recently been described by M. Letzel as *Geophilus submarina*. The learned Frenchman was probably unaware that it was figured and described as long ago as 1817, by Dr. Leach, in his "Zoological Miscellany," vol. 3, under the name of *Geophilus maritimus*.—C. W. Dale, Glanville Wootton, Sherborne, April 21st, 1894.

LEPIDOPTERA.

Melanic Form of P. pilosaria.—During the month of March I have taken three specimens of the black variety of *P. pilosaria.* It is, therefore, very clear the black race is increasing steadily in numbers in this district. I have taken about thirty in all, so that the proportion is now one in ten.—W. Brooks, Rotherham.

Diurnal Lepidoptera during March, 1894.—During the month of March I noticed five species of diurnal Lepidoptera on the wing, viz., *G. Rhamni*, *Pieris rapæ*, *P. napi*, *Vanessa urticæ*, and *V. comma*.—W. Gardner, F.R.G.S., Liverpool.

REVIEW.

"Secondary Sexual Characters in Lepidoptera," by J. W. Tutt.*—There can be no manner of doubt that the great body of British entomologists of later years have developed a tendency to deeper things than the mere collecting of thousands of insects in their cabinet drawers, without knowing the life-history, structure, and habits of these insects. The student of to-day is entirely different, and does not take for granted all the traditional literature of bygone generations, but strives to acquire for himself a personal knowledge of a group, a genus, or certain structural characteristics, the existence or use of which had hitherto been either unsuspected or idly passed over as of no importance whatever. In the work under notice we have an instance of this patient assiduity and research, and in dealing with the secondary sexual characters in Lepidoptera, the author imparts to his readers much valuable information concerning the methods employed by insects to induce pairing. Reference is also made to both winged and apterous females, and in the case of the latter it may well be said that truth is stranger than fiction. We have much pleasure in commending this excellent production to students of Lepidoptera, and wish the work the success it deserves.

Books, &c., Received.

"*Entomologist's Record and Journal of Varieties.*"
"*Irish Naturalist.*"
"*The Naturalist.*"
"*Science Gossip.*"
"*Proceedings of the Chester Natural History Society.*"

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* **Published by the Author, Westcombe Hill, Blackheath, S.E.**

TO CORRESPONDENTS.

Subscriptions, Exchanges, Correspondence, Notes, Papers for Publication, and all other communications must be addressed to the Editors "British Naturalist," Warrington.

All Exchanges, Queries, &c., for insertion in the following number, must reach us not later than the end of the previous month. All Queries must bear the writer's name.

Disguised Advertisements for the purpose of evading cost of advt., will not be inserted in the gratuitous exchange column. We request all Exchanges may be signed with name (or initials), and full address at the end.

Correspondents will please note and write on one side of the paper only.

Arachnida.—*The Rev. Fredk. O. Pickard-Cambridge, High Street, Swanage, will name and return any collections of British Spiders received from correspondents of the "British Naturalist," provided that several tubes be sent for their reception. He would also be glad to send types of British genera in return for any specimens he might wish to retain. The specimens* need not *be separated into tubes before sending, but a label, ready addressed and stamped, should always be enclosed. If the specimens are placed in separate numbered tubes, a paper, also numbered, should be sent for the reception of the names.*

Acarina.—*Mr. C. F. George, Belle Vue House, Kirton-in-Lindsey, will name any specimens of Acarina sent to him for that purpose.*

Diptera.—*The author of "British Flies" (Diptera), Fred. V. Theobald, M.A., F.E.S., 12, Trumpington Street, Cambridge, will name specimens of Diptera sent to him for this purpose. He will also advise on the subject of injurious insects.*

Conchology.—*(Land, Freshwater.) Mr. C. O. Pickard-Cambridge, Balliol College, Oxford, will name shells sent for identification. Applicants must keep duplicates of specimens sent.*

British Odonata (Dragon Flies), and British Orthoptera.—*Mr. W. Harcourt, Bath,* 195, *Ladywood Road, Birmingham, will name specimens and answer questions referring to above orders.*

Lepidoptera.—*Mr. Eustace R. Banks, M.A., F.E.S., The Rectory, Corfe Castle, Wareham, will name specimens of Lepidoptera sent to him for that purpose. Applicants must, however, send addressed label when requiring specimens returned.*

Mollusca: Marine and Terrestrial.—*Mr. B. Tomlin, The Green, Llandaff, will name specimens of the above Mollusca sent to him by subscribers for the purpose.*

Diptera.—*Mr. R. H. Meade, Mount Royd, Bradford, will verify and correct the names of specimens of Diptera sent to him by subscribers for that purpose.*

British Coleoptera and Hemiptera-Heteroptera.—*Mr. E. A. Newbery,* 12, *Churchill Road, Dartmouth Park, N., will name and return any specimens of the above Orders sent to him by our subscribers for that purpose. A stamped label for return should accompany each box.*

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LECTURER ON ECONOMIC ENTOMOLOGY FOR THE CHESHIRE
COUNTY COUNCIL.

This destructive pest of the black currant causes the disease known more generally as "knotting," "knobbing," or "bobbing," the latter term being the one most frequently used in Cheshire. Although the disease is only too well known to fruit growers, hitherto very little has been published that gives anything like a detailed account of the life-history of the pest, and it is almost entirely owing to this that I made the series of observations during the past year. Although a great deal of time was spent in making the investigation, I was unfortunately unable to ascertain the *entire* period of the migration of the mites from bud to bud, which is one of the most important points in the economy of the species, so far as the application of insecticides is concerned.

DISTRIBUTION.

In England and Scotland the disease seems generally distributed; but I have not heard of its occurrence in Wales; it may, however, be equally common there as in any other part of Great Britain. In Cheshire it is very prevalent indeed; I have seen it in no less than 80 different localities, extending over the whole of the county. The infested bushes frequently occupy some out-of-the-way corner, or fill up a gap in the garden, where it is supposed that nothing else will grow;

in such situations the pest is generally allowed to remain unmolested for years; indeed, it often happens that the grower, whether cottager or professional, is wholly ignorant of the presence of the disease.

I need hardly add that in such cases the bushes are veritable pest-places for the dissemination of the disease. Its rapid spread of late years is undoubtedly due, in great measure, to the propagation of diseased cuttings; these latter are only too often sent into fresh districts, and I feel sure that by this means alone quite 50 per cent. of new colonies are established; this statement I make with the greatest confidence, as instances have come under my own observation. I well remember a gardener who recommended cuttings from his infested bushes on the ground that they produced the finest fruiting buds he ever saw. The so-called "fruiting buds" were every one of them infested with the mites, and consequently were worse than useless. In making these statements I do not wish to imply ignorance in the whole fruit-growing fraternity. There are those who have done all that lies in their power to stamp out the disease in this district.* Six years ago, when attention was first called to this pest at Chester, there were very few gardens in the immediate neighbourhood that did not contain diseased bushes; now, in the gardens of the thrifty it is difficult to obtain specimens for lecturing purposes.

APPEARANCE OF THE DISEASED BUDS.

There is not the slightest difficulty in recognizing the disease, for every infested bud becomes aborted and swollen, and in bad cases they are often three or four times as large as the healthy fruiting buds; a glance at the plate will at once show the difference. A perfectly healthy branch is shown at Fig. 1, and diseased branches at Figs. 2, 3, and 4, and a × is placed opposite the diseased buds that they may be more readily identified.

THE CAUSE OF THE DISEASED BUDS

is due to the presence of an exceedingly small species of mite, belonging to the Phytopti. So small are the mites that they are scarcely ever visible to the naked eye, and when examined with a pocket lens they only appear as a white mealy substance in the buds. On examination with the microscope they appear as shining semi-opaque objects, very elongate, and having four legs, which carry them rapidly over the surface of the leaves. In winter they are frequently found anchored into the tissues of the embryo leaves, by means of a pair of stiff bristles situate at the anal extremity of the body. I have never attempted to count the individuals in a single bud, but there must be thousands of them, and it is by the constant irritation of these minute organisms, probably aided by the secretion of some matter poisonous to the plant tissues, that the buds become swollen and diseased.

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* I may specially mention the good work done by the Cheshire County Council, and by the Committee of the Grosvenor Museum, Chester. They have instituted classes, and have given free lectures on the various pests injurious to farm, fruit, and garden crops.

In the pamphlet issued by the Board of Agriculture [A $\frac{1-93}{1}$ Feb. 1893] it is stated that the mites "stray about upon the leaves and shoots, and as *they make* their peculiar gold-coloured galls upon the young and tender twigs, as well as upon the sheathing scales or embryonic leaves of the buds, it is believed that they live upon these." The "gold-coloured galls" are perfectly natural growths; they are the fragrant oil glands, and are found upon the healthy as well as the diseased plants. They are certainly not produced by the mites.

LIFE HISTORY.

The following notes were made from my own observation during the past year:—During the cold month of January the mites in the infested buds were all in the perfect condition, and although the temperature was often very low, the mites revelled in the severest frost, as one would in a cold bath on a summer's day. Frost seems to have no effect on them whatever, except to make them somewhat sluggish. True, they are well concealed within the buds, yet they cannot by this means escape the frosts, for the buds offer very little protection for their naked bodies, the fluid of which must be frost proof. On Feb. 20th egg laying commenced, and on this date I found them in hundreds in company with the adult mites. Later (March 6th) there were thousands of young forms (nymphs), eggs and adults; and sixteen days later (March 22nd) I examined flowers and expanded leaves. In the flowers I found a single Phytoptus (mite), which was walking about them in a very lively manner. As stated above, the normal colour of the mite is a clear semi-opaque white, almost glassy, but the specimen found in the flowers had the extremities reddish-brown, with the centre paler. The red colour of the mite very much puzzled me, and I at first thought it another species of Phytopti. A careful microscopical examination, however, proved it the true *P. ribis.* My time was too limited to search for more. Had I continued my search, no doubt I should have found them in considerable numbers. The discovery of a red coloured specimen was of interest to me, and no doubt will be so to others, but it has no practical bearing on the economy of the species.

On April 19th many of the old and very badly infested buds of last year had opened out very considerably, but had not produced, nor did they afterwards produce, a single leaf. These and the rest of the infested buds contained a living mass of the mites in all stages, completely covering every embryo leaf in the buds. At this date numbers of the old infested buds had already become black and dried up, due in part to the fact that the buds had been transplanted in the spring and to the excessively dry weather. All the old buds that were examined had no living mites in them, but the dead white desiccated bodies of thousands of mites covered the surface of the dead leaves of the buds. I am confident they were not the effete skins, cast off by the young mites, for the outline of several of the adult mites could still be traced. Had the life-giving juices of their bodies been sucked out by some predaceous insects, or had they died for want of food? Of their natural enemies I shall speak later on, and as to the supply of food, they had only to seek fresh fields, as some had already done. It may be, however, that the old stock die off annually, leaving their offspring to carry on the infestation.

May 19th—examined 50 of the old-infested buds which were sent me by Mr. Gillanders, from High Legh, which were taken from bushes that had not been transplanted in spring. Ninety per cent. of these buds were dead and dry—a few only having their basal portions with any life in them. In these there were many dead mites, which had undoubtedly died a few hours prior to my receiving them, as they still contained their colour and outline intact. Those buds that were quite dead and dry gave the same result as previously stated; *e.g.*, they were covered with the desiccated bodies of the mites, and not a living example was found amongst them. Strange to say, I failed to find a single living mite either on the bark at the base of the leaf stalks or in the newly-formed buds. My next examination was on June 2nd. At this time the newly-formed shoots had begun to harden, and the new buds on the first half of them had attained a length of 2½-3 m.m., very small, but just protruding from behind the leaf stalk. Between the base of the leaf stalk and the buds at the ends of the young shoots I found both adults and nymphs, but no eggs; although these latter were not found in the situations indicated, they must have been laid there, or the nymphs would not have been present.

I carefully examined a number of young buds, but found no mites in them. It is curious to note that the mites occurred near the terminal buds only; this will account for such *buds* in an infested bush being the most severely attacked. At this date (June 2nd) I could only find one of the old infested buds in a living condition, and this simply swarmed with adult mites.

On July 17th I again found the mites located between the leaf stalks and the buds, and with them many eggs; while ten days later (July 27th) newly-formed buds still small were present, but terminal ones were already showing signs of being infested. On examination these were found to contain adults, nymphs, and eggs, nearly all of which were located in the centre of the buds. This was the first occasion I found the mites within the newly-formed buds. The old infested buds at this date were every one of them carefully dried up.

During the month of August I was, unfortunately, away from home, and was not able to resume my investigations until September 13th. At this date the new buds showed decided signs of being infested: they were much swollen, and measured 2½ to 3 lines in length, and contained the pest in all its stages. I could not, however, find any of the mites behind the leaf stalks as previously, so that I concluded they had taken up their winter quarters for good, and had set to work in earnest to ruin the crop of fruit while yet in the bud.

Below I append a summary of my observations:—

(1) That there were a succession of broods produced during the months of February to September. Egg-laying taking place in March, April, June, July, and September, which was therefore very probably carried on throughout the whole season.

(2) That one of the mites, *i.e.*, the red one, was found wandering about the flowers on the 22nd of March, and there might have been others.

(3) That the mites first established themselves between the base of the leaf stalk and the young buds early in June (June 2), but were not found actually inside them until July 27.

(4) That so long as any life remained in the old buds swarms of the mites were found in them; as the buds died numbers of the mites disappeared, either dying a natural death, or being destroyed by predaceous insects. Of course, as I have already stated, some of them did certainly migrate and set up fresh colonies.

Let us now consider these facts from a practical point of view, taking first of all the period during which the mites travel from bud to bud. This, as already stated, takes place in March, and I may here add, in corroboration of this, that mites were also detected in the act of travelling from one bud to another in the spring by the writer of the pamphlet issued by the Board of Agriculture (*l.c.*). How long the mites continue their migrations has yet to be proved, but I am confident that it takes place during spring and summer, or, at any rate, so long as any mites remain in the old buds; hence, if we wish to apply any insecticide as a remedy, it should certainly be applied at the period of migration; but as this extends over an indefinite period, it is difficult to fix a time when spraying would be most effectual. March would appear the best time for an application, but spraying at this time would be sure to injure the flowers, therefore, the application should be made between the time of the setting of the fruit and the beginning of July. Spraying at such time would be sure to affect some of the mites, although I doubt very much if it would render any real service in clearing them off.

PREVENTION AND REMEDIES.

In very bad cases I would certainly recommend that the bushes be cut down in *winter, and burnt on the spot*, but this should never be attempted at any other time of the year. In winter the mites are all safely housed inside the buds; therefore, the removal of the bushes at such period could be accomplished with little or no fear of shaking the mites to the ground, or scattering them to the winds.

Where the disease is only partial, I would strongly advise hand-picking the infested buds, and burning them; they must on no account be thrown to the ground, or "dug in." If hand-picking be annually adopted, the disease in the course of three years would be reduced to such a minimum that the crop would in no way suffer.

In districts where black currants are grown on a large scale, hand-picking is a serious item; yet I cannot recommend any system that is more effectual.

If the grower wishes to apply insecticides, I may say that it is useless to do so between the fall of the leaf and the expansion of the buds in spring, because the mites, as already stated, are then carefully housed; I have never found a single example outside the buds during that period. The Board of Agriculture (*l.c.*) recommend "spraying . . . in the autumn before the weather becomes cold, and just after the leaves have fallen, if possible. This will economise liquid and labour, and will affect the mites before they get into the buds." This statement is, I venture to say, most misleading and inaccurate. I have proved beyond doubt that the mites begin to enter the newly-formed buds in July; therefore, any application made "after the leaves have fallen" would be practically useless in clearing off the mites. As a proof of this, last winter I tried dipping the infested branches in the well-known "Paraffin Emulsion," which had no apparent effect on the mites, thus proving the uselessness of the application of insecticides while the mites are in the buds.

Some very useful insecticides are given in the pamphlet issued by the Board of Agriculture (*l.c.*); and Miss Ormerod deals very fully with these in her "Manual," and in subsequent reports, to which I must refer the reader. But if insecticides are used, they should be applied at the time I have already stated.

During my investigations I found two larvæ of the Lacewing Fly (*Chrysopa sp.*), also numerous specimens of two species of Acari; all of which may possibly have been feeding upon the Phytopti, but I have no conclusive proof that they did. I can only say that I found them all inside the infested buds: the *Chrysopa* looking very pale and suggestive of having lived very much in the dark. I also found several specimens of a species of Thrips, in all stages, and all of them within the old buds, looking very pale, as if they, too, had been living inside the buds. So far as is known at present, these insects are plant feeders, and I merely mention the fact that it may not be lost sight of.

In conclusion, I beg to thank Mr. A. T. Gillanders for the liberal supply, from time to time, of infested shoots; and also Mr. John Pickering, of Poole Hall, Cheshire, for kindly forwarding a number of infested bushes. The latter were planted at the rear of our Museum, thus affording every opportunity of observing the disease.

SOME CURIOUS AQUATIC LARVÆ.

BY GEORGE SWAINSON, F.L.S.

(Continued from page 110.*)*

The reason of our particular interest however, in the larva of *Chironomus dorsalis*, was its very striking resemblance in all but colour to the marine annelid *Campontia cruciformis*, of Johnston, which had several times been captured on sea-weed and Zoophytes; for it is now certain that McLeay's guess was correct, and that this reputed marine worm is the larva of a *Dipterous fly*. We have several specimens of this form which we have mounted and stained with picro-carmine, and it is almost impossible to distinguish them, even under the microscope, from *C. dorsalis*. The mandibles, antennæ and the two pairs of false feet or pro-legs with horny hooklets, the intestinal canal, and lastly the two pairs of long respiratory retractile tubules which the larva can protrude from the eleventh segment, made it no longer possible to doubt that *Campontia* was the larva of a marine midge of the *Chironomidæ* family.

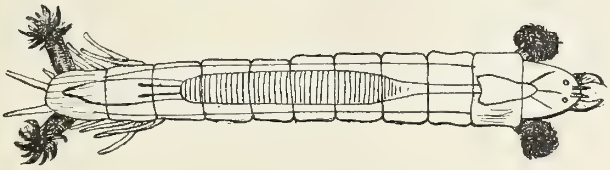

FIG. I—CAMPONTIA CRUCIFORMIS. MARINE LARVA OF MIDGE.
Thalassomyia Frauenfeldi of Schiner.

The great difference when alive is in the colour, for instead of the bright red of the "Harlequin" or Bloodworm you have in *Campontia* a transparent sea-green colour. In fact the hœmoglobin which gives the blood plasma in the "Harlequin" larva its beautiful tint, is replaced in the marine form by a light sea-green pigment with which the fat cells are coloured.

On one occasion when out dredging with a few members of the Manchester Microscopical Society, off Spanish Head, Isle of Man, a fine specimen of *Campontia* was dredged up adhering to sea weed from a depth of over 10 fathoms.

I have recently learned that Dr. Packard, of America, has recorded the discovery of a marine Dipterous larva in 15 fathoms off Salem Harbour, which he has named *Chironomus oceanicus*.[*] I have carefully compared my specimens with his drawings, and it is quite certain they are not the same species, the mandibles being slightly different, but more particularly the retractile hooked appendages on both the fore and hind legs vary considerably, and the respiratory tubules possessed by *Campontia* are not visible on the American species.

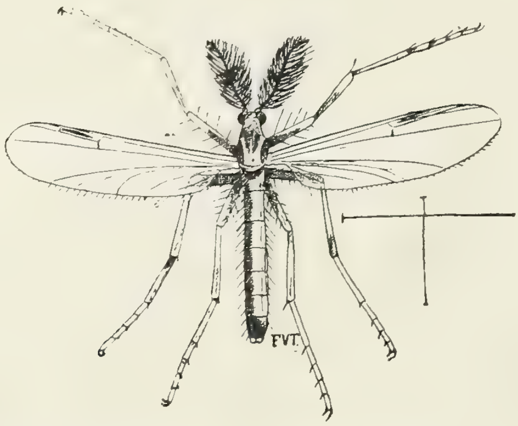

FIG 2.—CHIRONOMUS DORSALIS IMAGO.

The great difficulty I experienced in finding any one in England to assist in naming this and other species of Dipterous larvæ I have met with, prompted me to write these notes ; I have applied to many of the principal authorities on Diptera, only to find that there are several families, in which the life histories of only a very few species have been worked out. Surely, there are many excellent members of our Microscopical Societies throughout England, who only need the fact bringing home to them to induce them to make some attempt, however feeble, to fill up this gap, especially as the subject is a very interesting one, and the material abundant. The difficulty of obtaining specialists to undertake the work of describing many groups of insects has been recently referred to by the Editor of *Natural Science*, for he states that though Mr. Whymper's "Travels amongst the Great Andes of the Equator," were completed over 12 years ago, the volume in which the Zoological collection was described has been only recently issued, and this with several large groups of insects omitted, as no one has been found able to describe them. Professor Miall, to whom I sent my specimens, suggested that Johnston's *Campontia* was most probably Schiner's *Thalassomyia Frauenfeldi.* Schiner, however, gives no drawing nor any account of the larva in his "Fauna Austriaca," page 596, Vol. II. I feel sure, however, from the description, it is the same fly I have frequently seen on the pier end at St. Anne's-on-the-Sea, where the females were probably waiting for the receding tide to give them an opportunity of laying their eggs on the Obelia Zoophytes when once more uncovered, and where I have more than once found the larvæ, for says Schiner, "Herr Von Frauenfeld caught the specimen near Trieste, close to the sea shore, where it sat on rocks within the reach of the dashing breakers;" and Mr. H. M. Ridley, who found the species in a cave in the Isle of Wight in 1884, says, "they were sitting on the rock seeming to enjoy the dashing spray of the rising tide." We must now refer our readers to Mr. F. V. Theobald's excellent account of British Flies, Vol. I., for some interesting notes on *Parthenogenesis* in *Chironomus*, which I sent him. The following are some new and unnamed species of larvæ of *Chironomus*, which have been recently discovered and mounted.*

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[*] See Transactions of Essex Institute, Vol. 6, page 42.

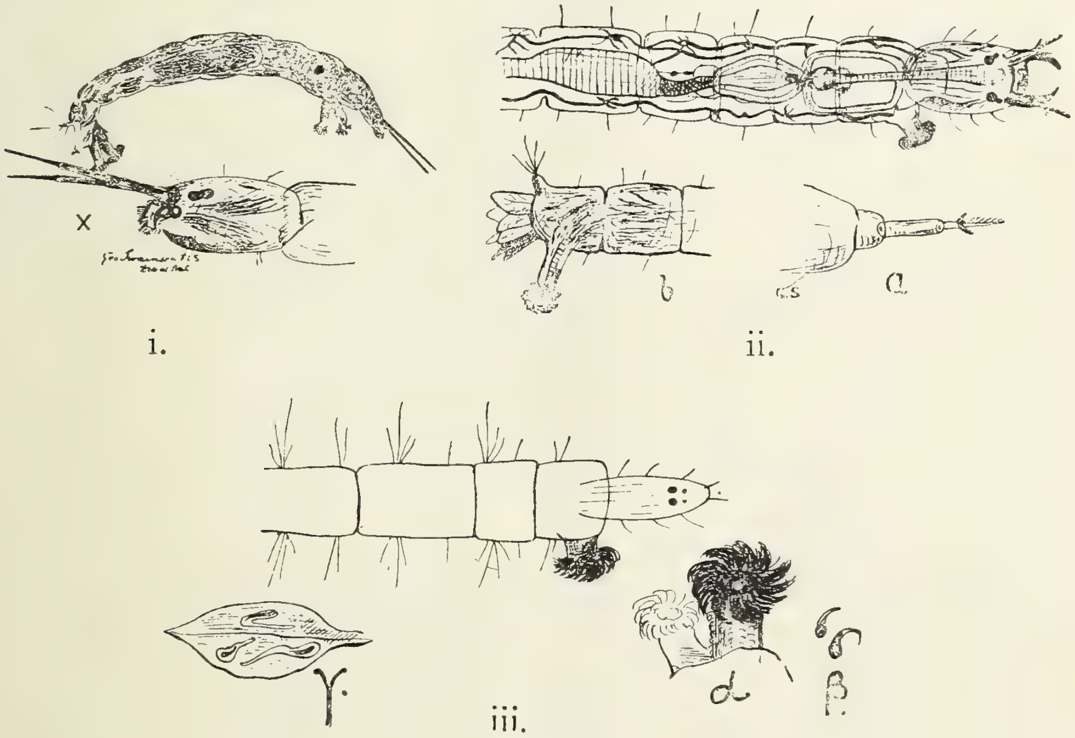

FIG. 3.—NEW SPECIES OF CHIRONOMUS LARVÆ × 10.

As some encouragement to young naturalists who wish to make a name for themselves, we may say that the above represent new and undescribed species, which we met with in 1892, on watercress, &c. How open the field is to others may be judged from the fact that Mr. Verrall enumerates as many as 268 distinct species of midges (*Chironomidæ*) indigenous to England, of which the larvæ of only a dozen are known.

The larva, Fig. 3. i., was very active in his movements, and his antennæ were so long that I thought at first I had one of the *Tanypus* genus under inspection, but I found the antennæ were fixed and not protrusile and movable, as in *Tanypus*.

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* We are indebted to Mr. F. V. Theobald and the Publisher, Mr. Elliot Stock, for the loan of these illustrations.

The two upper mandibles (one of which is shown in the enlarged drawing at *x*), work on a kind of pivot, but both meet for tearing purposes on the hard, chitinous lower jaw, thus making a tripod. They work, in fact, in planes at right angles to each other, their line of intersection being the axis of the head or lower jaw.

Larva, Fig. 3, ii., was found in the ponds on the golf links at St. Anne's-on-the-Sea, and is not unlike *C. dorsalis*, except in the antennæ *a*, and in the shape of the eyes. The nerve ganglia was seen on each side, and the secretion glands for making its tube-like dwelling amongst the mud or roots of water plants can be seen behind the pharynx; also notice anal segment *b* with pro-legs and branchial anal plates, &c.

My friend, Mr. Hammond, F.L.S., discovered Species Fig. 3, iii. which I call *Chironomus potamogetus*, because it is always found mining tunnels in the floating leaves of Potamogaton (y).

The larva has 14 segments in the body including the very protrusile retractile head and anal segment very like Fig. 3, ii. *b*. The anterior pro-legs are remarkable for the curious minute hooklets with which the skin below the exterior larger hooks of the sucker-foot are covered (Fig. 3, iii., α and β). They look like the projections on the proboscis of some of the *Nereis* annelids or that of the Gephyrean worm *Sipunculus*. The posterior feet are not ornamented like the fore feet, but are longer and more protrusile.

Most singular of all is the curious action of the mandibles and their position, so differing from Fig. 3, i., which meet on the horny plate below the mouth.

These mandibles work in an upright way, seeming to retract for the straight down stroke. As Mr. Hammond says, "they work in longitudinal-vertical and parallel planes, like the hooklets of the maggot of the blow-fly." You will see that the head is much narrowed to allow of more freedom of movement in the close quarters in which it resides.

(*To be continued.*)

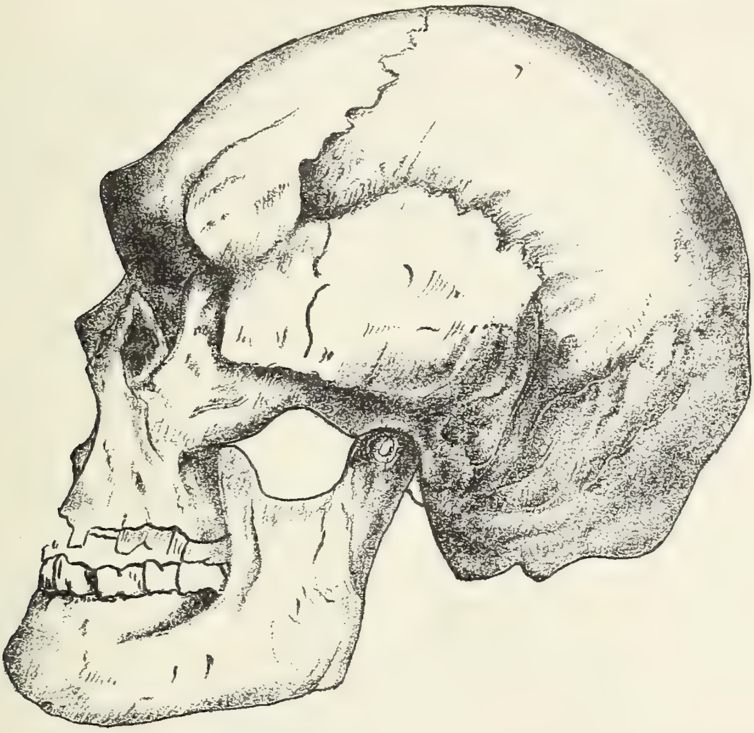
NOTES ON EARLY MAN: THE PLIOCENE PERIOD.

BY JOSEPH SMITH, F.R.S.A., M.R.I.A.

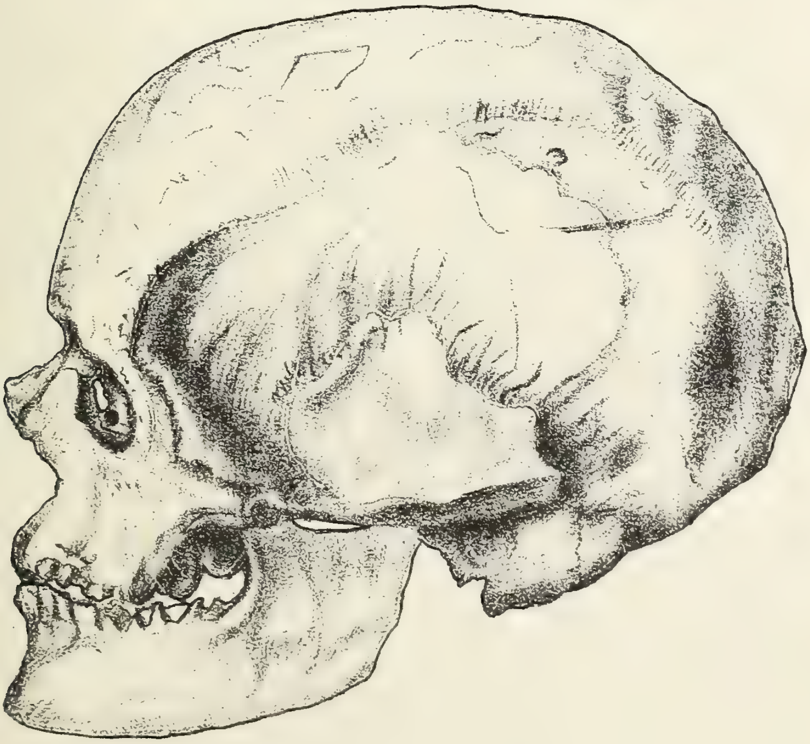
(*Continued from page* 116.)

The remains of Quaternary man have been found in as many as forty localities in the western part of Europe, and these excavations have rescued to science no less than forty skulls in such stages of preservation as to render them valuable in ascertaining the physical condition of man

Male Skull from Borreby (Denmark)



Skull of the Old Man of Cro-Magnon.



PREHISTORIC SKULLS.

as he existed in those early times. Not only have the various excavations yielded these, but numerous other fragments of the cranium have been gathered and utilised, besides a great number of single bones, and in some instances the entire skeleton.

At this time man was contemporary with—besides the existing species of animals, some of which have partly disappeared or migrated—the mammoth, *Elephas primigenius*; the woolly rhinoceros, *Rhinoceros tichorhinus;* the gigantic Irish elk, *Megaceros hibernicus;* the cave bear, *Ursus spelæus;* the cave hyena, *Hyæna spelæa;* cave tiger, *Felis spelæa;* the horse, *Equus caballus;* the reindeer, *Cervus tarandus;* the elk, *Cervus alces;* the musk ox, *Ovibos moschatus;* the aurochs, *Bison Europæus;* the hippopotamus, *Hip. amphibius;* and the cave lion, *Felis leo spelæa*, all of which lived during the greater portion of the Quaternary period, and many of which eventually became extinct.

During the deposition of the lower gravels, these animals appear to have had general sway and played the principal part. Man contested and disputed the ground with them, while during the period of middle alluvium, although the same animals existed, they were less formidable, and were apparently gradually diminishing. At the period to which we refer, the horse was predominating, adapting itself to the change, and at the time when the lowest bed of the upper alluvium was deposited, a great modification in the fauna is noted. The horse now is almost a stranger, and his place is filled by the reindeer.

All the remains of the human race referred to have been discovered in Europe, and although reference has been made to other discoveries, nothing reliable in data, as previously stated, exists to recommend them. Asia, in the opinion of Quatrefages, is the continent whereon the human species originated and whence it migrated; and Falconer has reasoned that if we seek for Tertiary man, the strata of and near the Himalayas are the formations which must be examined for the proofs of his existence.

The earliest race respecting which we have any definite data is that named the Canstadt, so called from the name of the village near which the first human fossil was found. A portion of the skull—the *dome*—was discovered along with some animal bones, so far back as the year 1700; afterwards there was found near Düsseldorf a complete skeleton, but unfortunately only a portion was saved from destruction by the timely interference of Dr. Fulhrott, and so preserved to science.

In the Neanderthal skull which belongs to this race, the frontal sinuses have an exceptional development, and the superciliary ridges, almost lost in the middle of the glabella, form a most strange protuberance above the orbit. In all the crania of males belonging to this race a greater development of the superciliary prominences which are so striking in the Neanderthal example is found.

The cephalic index of the Canstadt race, taken from the Neanderthal man is 72·, that of the La Truchère skull, which belongs to the latter part of the Quaternary period, is 84·32, giving a difference of 12·32, and at the present time the index of the Esquimaux is 69·30, which is below the index of the Neanderthal example; the index of the southern German is 86·20, which is only slightly greater than the index given by the La Truchère skull. Now, the peculiarities of this Neanderthal cranium, which are generally described as brutish and apish, and of skulls similar to it, are of no great import, for it does not follow that individuals who possess these peculiar skulls must necessarily be intellectually inferior—a point of great weight,—since it is usually regarded as an indisputable fact that such inferiority exists in connection with this type of cranium. Voigt, Quatrefages tells us, quoted an example at the Paris Assembly of Anthropologists of one of his friends, a Dr. Eminayer, whose cranium exactly recalls that of the Neanderthal man, and who was, notwithstanding, a highly distinguished lunacy doctor, and Quatrefages himself, when passing through the Copenhagen Museum, was much struck by the Neanderthal characteristics of a skull in that collection; it proved to be that of Kaye Lykke, a Danish gentleman, who played a prominent part in the political agitation of the seventeenth century. The head of the Bishop of Toul, which is of the fourth century, even exaggerates some of the most striking features of the Neanderthal example; the forehead is still more receding, the vault more depressed, and the head so long that the index is 69·41. Lastly, the skull of the Scottish hero, Bruce, is another reproduction of the Canstadt type.

While some excavations were being undertaken so far back as the year 1858, under the supervision of the elder Lartet and Christy, in the valley of the Vezère, and near the village of Les Eyzies, the workmen unearthed on one of the escarpments of Cro-Magnon the remains of three men, a woman, and a child, and these remains have, like those of the former race, been styled after the locality in which they were found. The Cro-Magnon race is the second which played its part during the Quaternary times. The only feature which the Neanderthal man and the Cro-Magnon old man have in common is the cranial proportion. The index here is 73·76, and recedes to 70·05 in a skull belonging to the latter race from the locality of Solutré, while the famous Engis cranium gives us 70·52.

In every feature, else, do the skulls of these races differ, the Cro-Magnon head lacking the low retreating forehead and superciliary ridges, which convey the idea of a simian character, and the flatness of the vault, which is found in all the Neanderthal examples. On the contrary, however, it shows a large forehead, a dome of the finest proportions, while the skull itself is remarkable for its capacity, which is, according to the eminent Broca—and he made his computations with the greatest precaution, consequently giving his results the lowest possible value,—1,590 cubic centimetres, about equal to 96·99 cubic inches. This capacity is greatly higher than that of the modern Parisians.

The characteristics of the Cro-Magnon race are an open forehead, a large, narrow aquiline nose, which must have given it some claim to beauty, so much so that anthropologists have stated that notwithstanding any strangeness about the face, which must have resulted from the smallness of the eyes, there is nothing in any way repulsive in the features of this magnificent race. Hamy, the great anatomist, and one of the greatest anthropologists of the present day, measured these skeletons with the following results:—"The Cro-Magnon race was tall; the mean height is about five feet ten inches. The Cro-Magnon old man himself measured five feet eleven and a half inches, and the Mentone man, which was discovered by Rivière *in situ*, was as tall as six feet. The Cro-Magnon woman was five feet five inches. Their bones convey the idea of a remarkably strong race. They are thick and solid. The femurs of the Cro-Magnon old man are also the broadest and thickest which have ever been measured by Broca."

The discovery was made in the Grenelle alluvials immediately above the strata from which the Canstadt remains were unearthed, and must of necessity be of very great age. There was, however, evident progress of civilization visible, for the Cro-Magnon people possessed arms of flint, &c., which were more numerous, varied, and more massive than those predominating during the time the Canstadt race had lived. To estimate their domestic culture from the contents of the kitchen-middens they have left behind them, they had lived well, and had procured birds and other small animals by hunting and the use of the bow, attacking the larger animals with the lance and spear.

In leaving the valley of the Vezère we can trace the history of this race almost step by step, for, from the little village of Les Eyzies to the rock shelter of Moustier, which is only distant about eight miles, there have been found no less than eight settlements, all of which, on account of their records, have become justly celebrated. These settlements are the Moustier cavern, the Moustier shelter, the Madelain shelter, the Cro-Magnon shelter or burying place, the Laugerie-Haute shelter, and the Laugerie-Basse shelter, the Gorge d' Enfer, and the Les Eyzies caverns. The earliest is the Moustier settlement, the most recent that of the Madelain, the remaining six being the successive links in the history of this noble race. The inhabitants of the Moustier station do not appear to have been superior to the members of the Canstadt race, which has been referred to, and in all probability they were associated with them. They fed on the mammoth, the lion, the cave hyena, and bear, and they made use of a crude and formidable type of lance-head, smooth on one face, rough on the other, the edges being sharp. It is this special form which constitutes the Moustier type of weapon.

The Laugerie-Haute flints show a finish which is remarkable, and their fineness and beauty are characteristics of the locality.

To what place did the Cro-Magnon race disappear? This is a question which to the present day still remains unanswered. Anthropologists are agreed, however, that both the Canstadt and Cro-Magnon races have not as yet disappeared, and can be traced even at the present day. Quatrefages* tells us that Hamy, who has laboured so much in the interests of anthropology, extending and enlarging this interesting branch of study, has met with the type amongst the Zaraus collection of Basque skulls collected by Broca and Velasco; he has traced it in the remains from the megalithic tombs of Africa explored by General Faidherbe; he has traced it in the Kabyles of Beni Masser, and in the Djurjura.

The type was likewise traced amongst the inhabitants of the Canary Islands, and is seen in the skulls forming the collection of the Barranco Hindu at Teneriffe. In that collection Hamy noted skulls, the ethnical relation of which to the old man of Cro-Magnon was indisputable.

The chief centre of the Cro-Magnon races was the south-west of what now is modern France. The Vezère was, so to speak, the cradle of the race. Its descendants spread into Italy and the north of France, invading the valley of the Meuse, where they encountered numbers of other races who disputed their settling. And so mixing with these, assisted by conquest or otherwise, we find, as time advances, what are known as the historic invasions taking place, and it is from a mixture of these elements brought together by war, and fused by the experiences of peace, that our European society of the present day has originated.

REPORTS OF SOCIETIES.

THE SOUTH LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY.

E. Step, Esq., President, in the chair.

Mr. H. B. Laurence, of Anerley, was elected a member.

Mr. South exhibited a bred series of *Boarmia cinctaria*, Schift., with the parent female from Glengariff, Ireland. Like the female, they were pale, but not so pale as those captured by Mr. Kane some time ago. Also the New Postal Box, invented by

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* "Human Species," p. 335.

Dr. Knaggs. A trial was made, insects were placed in it, and after rough usage it was opened, and they were quite intact, showing it to be a very successful device.

Mr. Barrett, on behalf of Mr. Sydney Webb, the pick of his valuable and extraordinary varieties of the Tigers, and, no doubt, unequalled in the world, viz., *Arctia villica*, L., varying from almost spotless to nearly black; *A. caia*, L., spotless, brown marbled, pale blotched, pink shaded, black suffused, and half one colour, half another, &c.; *Nemeophila plantaginis*, L., red and pale; *Callimorpha dominula*, L., yellow, white spotted, pink, and dusky; and contributed notes on the normal and abnormal variation shown by the exhibit.

Mr. Frohawk, a specimen of *Vanessa urticæ*, L, having the blue marginal spots exaggerated, and extending into the black border about twice the usual distance.

Mr. Adkin, a case containing series of most of the genus *Tæniocampa*, showing extreme variation, all from the New Forest.

Mr. Williams, a bred specimen of *Pieris napi*, L., in which only the hind wings had developed.

Mr. Turner, specimens of *Sirex gigas*, from Box Hill and Chichester, several species of Neuroptera, and specimen of *Bombylius major* from Box Hill.

May 24th, 1894, E. Step, Esq., President, in the chair.

It was announced that Mr. T. W. Hall, F.E.S., had been elected a Vice-President, in place of Mr. J. Jenner Weir.

Mr. C. A. Briggs exhibited a var. of the under side of *Lycæna argiolus*, L., having several spots considerably lengthened into streaks and some united; also a var. of *Vanessa io*, L., with the eye only partially developed.

Mr. Hall, a specimen of *Dicranura bicuspis*, Bork., with its cocoon, and remarked how closely the cocoon harmonized with the bark.

Mr. Fremlin, a large number of bred vars. of *Vanessa urticæ*, L., one series being of premature varieties; another showing variation in number and size of the characteristic spots in the centre of the fore wing, and ranging from only one spot present to four blotches; and a third series showing more or less suffusion of the orange coloration; one specimen was almost black.

Mr. Dennis, a number of similar vars. of the same species, and one specimen having a perfect, and several an imperfect band on the upper wing.

Mr. Filer, a series of *Nyssia hispidaria*, Fb., taken in Epping Forest this year.

Mr. R. Adkin, a long and variable series of *Boarmia cinctaria*, Schiff., bred from Co. Cork ova, one extreme var. having only a broad marginal dark band, a central light band, and a basal dark patch; all living larvæ of the same species.

Mr. Henderson, a specimen of *Macroglossa bombyliformis*, Och., taken at Brockenhurst during Whitsun.

Mr. Billups, the following new and rare Diptera:—*Chortophila setaria*, Mg., from Dulwich; *Blepharoptera inscripta*, Mg., from Oxshot and Bromley; *Heteromyza atricornis*, Mg., from Oxshot; *Hypostena medorina*, Schnr., from Oxshot; *Lepsis punctum*, F., and *Callomya amœna*, Mg., both from Bromley; also on behalf of Mr. Manger, a small collection of Australian Coleoptera and Homoptera.

Mr. Hamm, a series of *Chrysophanus phlœas*, L., vars., one being an intermediate var. *schmidtii*, Gerh.; a series of *Hybernia leucophearia*, Schiff., showing extreme range of variation; a series of bred *Agrotis saucia*, Hb., all very light, and following the female parent form; a striking var. of *Apamea unanimis*, Tr., having a light grey cloud extending from the apex of the fore wings along the hind and inner margins to the base; also a specimen of *Lithosia griseola*, Hb., of a brown instead of a leaden hue.

Mr. Williams exhibited a long bred series of *Pieris napi*, L., showing extreme variation, and read a short paper thereon.

Mr. Sauzé, insects taken at Seal Chart, during the Society's Field Meeting on May 19th.

Mr. Turner, two specimens of the rare Homopteron, *Centrotus cornutus*, taken by Mr. Lewcock, at the same place also specimens of *Helix lapicida*, L., from Box Hill.

Mr. Step, *Helix lapicida*, L., *Clausilia laminata*, Mont., with var. *albinos*, Mog., and var. *pellucida*, Jeff., *Physa hypnorum*, L., and a striking banded var. of *Limnœa peregra*, Müll.

Mr. Step read a paper entitled "Land Crabs."—Hy. J. Turner.

CITY OF LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY.

Tuesday, 1st May, 1894.—The President (J. A. Clark, Esq.) in the chair. The following gentlemen were elected members:—H. H. May, D. C. Bate, P. R. Richards, and G. H. Shields, all of South London.

Exhibits:—Mr. Battley, a series of *Brephos notha* from near Broxbourne, with specimens of *B. parthenias* for comparison. He remarked that both sexes of *notha* were without the cream-coloured blotches so conspicuous on the fore wings of *parthenias*. The antennæ of male *notha* were pectinated. Mr. Gurney, *Silpha quadripunctata*, *Coccinella 22-punctata* and *C. 14-punctata*, from the New Forest; also *Dermestes murinus* from Ongar Park Wood, Essex. Mr. Lewcock, a small, but perfect female specimen of *Biston hirtaria* from which a parasitic (dipterous) larva had emerged and since become a pupa. Young *hirtaria* larvæ had also emerged from the opening made by the parasite; these had, of course, been hatched in the body of their parent. Mr. S. J. Bell, some curious ova laid on a primrose flower taken from a bought bunch. They were of a pale colour, with a dark brown ring round the top and another round the base, and there were two dots of the same colour between the rings. Their shape resembled that of a butter tub.

Mr. Battley announced that queen wasps were very plentiful at Southend, and he recommended members to kill as many as possible, so as to reduce the probability of another plague like that of last year.

Tuesday, 15th May, 1894.—The President in the chair. Mr. T. L. Rix, of 20, Hartham Road, Tottenham, was elected a member of the Society.

Exhibits:—By Mr. Battley, preserved larvæ of *Miana strigilis*, exhibiting two distinct forms of coloration, viz.:—Grass-green and dirty cream colour, and a third form intermediate between these two. By Mr. Clark, a bred series of *Aleucis pictaria* from the New Forest. By Mr. May, larvæ of *Geometra papilionaria* from Hayes, Kent, and larvæ of *Pseudoterpna pruinata* from Epping Forest. By Dr. Segueira, *Nemeophila plantaginis* and var. *hospita*; also *Fidonia conspicuata*, and vars. of *Ennomos quercinaria*, one of which was a fine dark-banded form. Mr. Prout remarked that some larvæ of *Miana furuncula* which he once had resembled the *strigilis* exhibited by Mr. Battley. Captain Thompson said that he had received a letter from a Birmingham correspondent who wrote that he had taken about 20 specimens of *Neuroni popularis* flying low over the grass in Epping Forest, and that they had revealed their whereabouts by a slight clicking noise. Mr. Prout, Mr. Nicholson and others referred to other instances of slight noises produced by Butterflies and Moths. Mr. Battley stated that during a visit to the New Forest at Whitsuntide he had taken a nearly half-grown larva of *Apatura iris* from the same branch of sallow he took one from in 1892.—C. Nicholson and A. U. Battley, Hon. Secs.

THE MANCHESTER MICROSCOPICAL SOCIETY.

At the Monthly Meeting of the Manchester Microscopical Society, held on Thursday, the 3rd May, 1894, a paper was read by Mr. W. Moss, on "The Radula as an aid to classification." The paper was illustrated by a series of shells and by means of lantern slides and mounted radulæ, the latter ably exhibited by Mr. Furnival with the oxy-hydrogen lantern and lantern microscope.

The value of the radula as an important aid in the classification of univalve Molluscs was shown by instances of shells conchologically resembling each other but differing widely in the radulæ, and by species far apart in conchological resemblance and geographical distribution possessing very similar radulæ. The system of classification based on conchological data was shown to be generally supported by the evidence of the radula, and whilst neither shell nor radula could be relied upon absolutely to determine species, the latter often supplied the missing link in the evidence which the shell alone was unable to furnish.—W.M.

LEPIDOPTERA.

Scarcity of Insects.—The weather here up to the present time has been most unfavourable for collecting, and insects have been scarce. Although the sallows were in fine condition during the latter end of March and beginning of April, very few of the Tæniocampidæ put in an appearance, save *T. gothica*. Sugar has yielded nothing up to the time of writing. During May searching for larvæ in waste places at night proved somewhat lucrative, however. A fine specimen of *S. populi* was captured in Strand Street, in the town of Douglas, this morning, and brought to me alive.—H. Shortridge Clarke, Sulby Parsonage, Lezayre, Isle of Man, June 4th, 1894.

On Type Insects.—*The Canadian Entomologist* for this month (May) has just come to hand, and I would ask Mr. Dale to mark carefully a statement on p. 142 thereon, by the well-known naturalist, Mr. A. R. Grote, M.A. He writes as follows :—"The description is the sole real authority for the authenticity of the 'type.' A number of times have I in print drawn attention to this fact, that when a supposed 'type' contradicts the published description, the 'type' must be held to be spurious. Not only does literature bring ample evidence that 'types' have been subsequently made, but a mistake in labelling, a changing of the label may not infrequently occur, and has often occurred as the result of accident. We may go further, and say that a description must tolerably well conform to the appearance and character of the specimen to be accepted as having been drawn up from it." In the Introduction to Vol. IV. of my *British Noctuæ and their Varieties*, I have discussed at length what appears to me the proper usage of "types," and if Mr. Dale will only do me the honour to read what I have written thereon, and tell me wherein my opinions differ from his own, I shall be very pleased to discuss the matter with him.—J. W. Tutt, Westcombe Hill, S.E., May 18th, 1894.

COLEOPTERA.

I send you herewith a few beetles, and shall be glad if you can name them for me. In December last I received a clutch of four eggs of the Wood Sandpiper from Tornea, Lapland. The eggs in question were taken in 1891. On January 4th last, on opening my cabinet I found amongst the lining of cotton wool seven grubs. They were hidden in the wool, and whenever I disturbed one and brought it to the surface it immediately buried itself again. I took them all out and put them in a box with some wool and kept them. They apparently did not eat anything, being, I suppose, full fed; and on the 20th the first turned to pupa, and by the 30th the whole seven turned. The first beetle emerged on April 19th, and three others between 12th and 21st; the other three have not yet emerged. The curious part of it appears to me that out of the same pupa case on the 12th there emerged a beetle and a larva. I am certain of this fact that there were originally only seven of the larvæ. They were much larger than the small larvæ in box 1. I send you the whole lot for your inspection, and have numbered the boxes.

Box 1.—Empty pupa case and larva, with beetle that emerged on April 12th.

Box 2.—Four beetles; one emerged on April 12th, and three between 12th and 21st.

Box 3.—Three empty pupa cases, insect emerging between April 12th and 21st.

Box 4.—Remaining three pupæ.

—Herbert Massey, Didsbury, April 22nd, 1894.

The species accompanying this interesting communication appears to be *Anthrenus varius*. The larva differs slightly from that of *A. museorum* in being of a brighter yellow colour, but in other respects it is very similar. I do not think it can be regarded as a British insect, and the precise information given by our correspondent would tend to confirm this view. We thank Mr. Massey.—G. A. L.

Sphodrus Leucophthalmus, L.—In our last issue Mr. B. Kendrick favoured us with further particulars respecting the capture of this species at Warrington. Having previously replied to his query concerning the term "leucophthalmus" (*British Naturalist*, 1891, page 198), I had dismissed the subject. However, as he again raises the point, it may be as well to state that, although the term signifies "white-eyed" (from Greek λευκὸς, white, and ὀφθαλμὸς, eye), this feature is not constant. Very few of the specimens which have passed under my notice can be said to possess white eyes. As a matter of fact, I have one only in my own collection, and that was captured by myself in Oxford Road. I should be inclined to regard the whiteness or transparency more as a symptom of disease than a characteristic. With regard to the reddish colour referred to by Mr. Kendrick, it is not at all singular; and the allied species (*Pristonychus terricola*) varies in colour even more than Sphodrus. Respecting the use of the prolonged coxal process, I am unable to enlighten him, but some of the genus Dytiscus, to which he alludes, also are remarkable for this peculiarity. Indeed, in *D. circumflexus* this feature is more strongly marked than in *S. leucophthalmus*.—G. A. L.

ARACHNIDA.

SPIDERS NEW TO SCIENCE.

Spiders of the family *Lycosidæ* are now abundant everywhere; the females, according to their well-known habit, hurrying off with their compressed-spherical egg-sac in tow behind.

Collectors should secure specimens soon, for the males rapidly die off. They must not imagine, moreover, that all the black, swift-running spiders they may come across are of the same species; there being no less than eight or nine species now adult, several of them often occurring together, and within a very small area. *Pardosa* (*Lycosa*) *amentata*, the largest, abundant in meadows, resting on hatchways, brickwork by the waterside, etc., and in many other places; *prativaga; proxima* (easily recognized by the yellow diamond-shaped mark on the cephalothorax); *annulata; nigriceps; pullata; monticola* and *palustris*, two very closely allied species, with three yellow bands on the cephalothorax; and *lugubris*, which last absolutely swarms in woods, rushing over the dead leaves in the hot sunshine, easily recognized by the broad white band down the cephalothorax. *Herbigrada* should also be adult in a week or so; it occurs on sandy commons. The *Lycosas* proper, including *Tarentula*, are also adult; *pulverulenta; cuneata* and *andrenivora;* while the two large species, *Trochosa ruricola* and *tervicola*, may also be found beneath stones and logs, usually, but not invariably in damp localities.

Of this latter genus (also included by some authors in *Lycosa*) I have the pleasure of recording now for the first time a fine species new to science and also, therefore, to be added to the British list—*T. spinipalpis*. They will probably be found in most water-meadows, beneath hatches which have been left on the grass, brickbats, logs, boards, etc., and may easily be distinguished from the other two species mentioned above by their smaller size and deep umber-brown hue, while the males may at once be recognized by the cluster of seven or eight stout, stiff, black spines at the apex of the radial point on the under side. A fourth species, *robusta*, must also be now recorded for the first time as occurring in Britain. A male and six females were taken beneath stones near the sea shore. Many other beautiful species of the same family are now to be obtained, *L. leopardus* in swampy places, and *L. picta* on sandy commons. Of the latter there occurs a lovely pale variety on the sandhills in several localities; while of the genus *Pirata*, *latitans* and *hygrophilus* are now becoming adult, and the much larger *piscatoria* will be so in about a fortnight, all of these being obtained in swampy marshes.

Collectors should never omit to secure specimens whenever they happen upon any in a comparatively new locality, or at an unaccustomed season of the year, for even an expert cannot pronounce with absolute certainty the identity of every specimen he may see racing hither and thither over the herbage.—F. O. P. C., Swanage, May 8th, 1894.

NOTES.

Review.—In our review of Mr. J. W. Tutt's work, "The Secondary Sexual Characters in Lepidoptera," we omitted to state that the *brochure* is published at one shilling.

List of Natural History Objects.—One of the most interesting "Lists of Natural History Objects," &c., is that recently issued by Mr. Charles Jefferys, of Tenby, and which should be carefully read by all interested in Natural History. We strongly recommend our readers to peruse this new list, as containing many items of interest.

Hübner's Exotische Schmetterlinge.—A short time ago a revised edition of Hübner's Exotic Butterflies—"Exotische Schmetterlinge"—corrected and enlarged under the editorship of W. F. Kirby, F.L.S., of the British Museum, was announced, and the first two parts of this elaborate work now lie before us. Each part contains 10 plates, perfect in detail and colouring, and which greatly add to the value and usefulness of the work. This new edition, which is a great success, is a valuable addition to the literature relating to the study of Entomology. Amongst the list of subscribers we notice the names of many eminent British collectors, whose support may be regarded as a guarantee that the new edition of the "Exotische Schmetterlinge" will, when completed, be of exceeding value and usefulness as a work of reference. We must congratulate the publisher, Mr. P. Wytsman, Brussels, on his enterprise in bringing out this new edition of Hübner, and to him all students of Entomology should feel deeply indebted.

Herbarium Lichen Flora.—Of Natural History studies, one of the most interesting is the investigation of the lichen flora, which offers to the student a wide field for original research. The Rev. W. Johnson, of Sheldon, near Darlington, with the view of giving a greater impetus to the study of these obscure plants, has undertaken to issue a local Herbarium of the North of England lichen flora, which will be issued at intervals, in fasciculi of convenient form, and which will include dried specimens of the lichens indigenous to the counties of Cumberland, Durham, and Northumberland. These counties—especially Cumberland—are rich in a well-developed lichen flora, which has not hitherto been specifically studied, nor representatively set forth in any Herbaria. The Herbarium will be based on the new and excellent "Monograph of British Lichens," by the Rev. J. M. Crombie, M.A., which is well illustrated with a series of micro drawings, and the first part of which has only recently been issued by the Trustees of the British Museum. The utility and value of such an Herbarium cannot be over-estimated, and such an opportunity as the present one should be embraced by all those interested in the study of lichen flora. No doubt up to the present time great difficulty in obtaining reliable specimens has been experienced, but the present occasion removes this obstacle, and there cannot now be any excuse for the lichen flora being unrepresented in public herbaria. It is to be anticipated the issue of these fasciculi will increase the number of students of these obscure plants, and excite a greater interest than has hitherto been shown in the development of these lowly organisms of plant life. It is scarcely necessary to add that the issue will be limited, and we wish the compiler the success his undertaking deserves.

REVIEW.

"RANDOM RECOLLECTIONS OF WOODLAND, FEN, AND HILL," BY J. W. TUTT, F.E.S. Lond.: Swan Sonnenschein & Co., 3s., pp. 1-183; also from the Author, Rayleigh Villa, Westcombe Hill, S.E.—In this series of nine interesting articles, Mr. Tutt has provided his readers—and they deserve to be numerous—with much natural history information, in a pleasant and readable form. Though largely, it is by no means exclusively, entomological; and it is evident that the author's sympathies with and knowledge of living creatures are by no means restricted to the class in connection with which his most useful scientific work has been done. To the rising generation of naturalists, and to the still larger class, who, without undertaking any special work, feel a real though it may be somewhat indefinite interest in natural history, we can recommend Mr. Tutt's book as well worth perusal; we say this the more readily, because it is the work of one who is not on the one hand a mere collector or on the other a mere arm chair theorizer, but who has a wide knowledge both of the practical work and of the literary and philosophical aspects of natural history, and because we cannot blind ourselves to certain blemishes which we hope may disappear from a subsequent edition. The style of the articles is on the whole so good, that we regret to see it marred by even one or two offences against good taste; the word "pub" is used several times, presumably for inn, in the article on "One of the Will-o'-the-Wisps of Fenland," and is an offence to the eye, whilst the pædagogic style into which the author occasionally drops is peculiarly irritating. A tendency to personify Nature, who is referred to as the Great Mother, will elicit a grim smile from anyone who has thought much about the facts which may fairly be described as *dysteleological*, and which suggest rather the typical Step-Mother, whether with or without capitals. Both on pp. 113 and 117 this tendency is curiously displayed; Nature is alleged to have worked consciously and for definite purposes; a proposition, not only inconsistent with well-known facts, but philosophically unthinkable. On page 113 Mr. Tutt asks why certain female insects are protectively coloured, in this differing from the males of the same species: he answers his own question thus: "Is not the reason simple enough? It is on their safety that the continuation of the species depends. . . . . The Great Mother selects and preserves some particular form which is best enabled to escape from its enemies, in order that when the number of its enemies is large, it may escape utter annihilation at their hands." As an example of pseudo-logic, the "in order that" in this extract cannot be surpassed. Like every intelligent man, Mr. Tutt is a lover of poetry, but has he forgotten the words of a keen observer, whose real insight into nature helped to make him a great poet:

So careful of the type? but no.
From scarped cliff and quarried stone
She cries "A thousand types are gone:
I care for nothing, all shall go"?

Had he done so he would have avoided several instances of what in one of his most trenchant articles Mr. Huxley has described as pseudo-science. Something of the same kind appears on p. 79, where an insect's instinct is described as "unerring," whilst a dozen lines lower down we read that certain actions "exhibit the great inferiority of the instinct of the insect to that of the bird." Careful perusal of the passage shows that there is no real contradiction, but suggests that some other adjective than "unerring" might have been used. Either the Kentish blindworms (*Anguis fragilis*) are very different from those in other parts of the country, or Mr. Tutt's description of them (p. 121) is inaccurate; we have not seen Kentish ones, though we have examined many from our Northern and Midland and a few from our Southern counties; we suspect that the author cannot have seen many young ones, or he would have hesitated to have described them as "grey brown on the back, with whitish bellies when young;" all that we have seen have been quite black below, and usually bright yellow on the back, with a central black band terminating in a spot on the head, thus presenting a striking contrast to the sombre ground colour with a peculiar metallic gloss which characterises the adults. "The snake" (*i.e.* ring snake) we are told (p. 167) "casts its skin two or three times a year. It lives chiefly on small insects, but frogs are supposed to be a special delicacy. It is said that when a snake catches a frog, it commences by covering the frog's hind legs with a slimy fluid, after which it sucks them down." Both our viper and ring snake slough oftener than thrice a year; the latter undoubtedly prefers frogs to any other food; and anyone who has watched the slow disappearance of a frog into the alimentary canal of the ring snake will understand the origin of the marvellous stories which have been circulated about the lubrication of its dinner by the snake, whose salivary glands are stimulated by the motion of the jaws and the struggles of the frog; some of the saliva oozing in the form of slimy foam from the snake's mouth. With regard to the alleged increase of darker insects in our manufacturing districts we take leave to doubt the fact; we have good reasons for believing that not a few entomologists who share Mr. Tutt's views on this point have allowed themselves to be swayed too much by a plausible theory. When the fact has been demonstrated, we shall accept the theory without hesitation; we feel that it ought to be so, but think it is not. After pointing out in no unfriendly spirit some of the weak points of the book we may sum up by saying that, though, as our readers will have seen, even Mr. Tutt sometimes nods, his errors are mainly the result of haste, and that his work throughout manifests a genuine love of nature, such as we should wish to see more widely diffused, that his style frequently rises into eloquence, and that we cordially recommend this book to all our readers.

PROCEEDINGS OF THE CHESTER SOCIETY OF NATURAL SCIENCE AND LITERATURE, No. IV. (pp. 139 to 351). Chester, 1894.—We are not told why this Society has allowed so long a time as ten years to elapse between the dates of the third and fourth issues of its proceedings. It has not been altogether for want of materials, as some of the papers in the present part were read so long ago as 1884, but the recent date and practical character of the majority of its contents indicate that the Society has now fairly entered upon a period of great activity, and we are consequently not surprised to hear that it is in a very flourishing condition, and has a roll of over 600 members.

Two of the earlier contributions are from the pen of Prof. T. McK. Hughes, a former President of the Society, one of which describes the *Silurian Rocks of North Wales* in some detail. The other is a lecture on *Caves and Cave Deposits*, with particular reference to the well-known examples in the Vale of Clwyd, and the question of their pre-glacial age. The subject is brought down to date in an appendix to the paper. Mr. W. Shone has a series of contributions, in part supplementary to work which has appeared in the Journal of the Geological Society of London and elsewhere, on *Subterranean Erosion and some of its effects*, in which he shows good cause for attributing to this hitherto neglected principle of geology the production of the phenomena of submerged forests, which form such a characteristic feature of the Cheshire shore, as of many other lowlying parts of our coasts. The immediate effect of subterranean erosion is lateral subsidence of the surface, hence in some cases landslips such as the recent catastrophe at Sandgate. Mr. Shone suggests other effects of this action, in the production of the cup-shaped hollows common in sand-dunes, and other rocks.

One generally, if not already an enthusiast, fights shy of meteorological observations, but we found the three papers by Mr. A. O. Walker not only valuable, but actually interesting. In *The Climate of the North Coast of Wales*, he summarizes the observations and experience of the quarter of a century which has elapsed since he set out the lines upon which the Society has since chiefly travelled, and shows that the variations of climate in so limited an area as that comprised in the Society's district may form the basis for much suggestive speculation, and have a bearing even upon the Home Rule question. The exceptional weather of last year is the subject of several papers, in one of which Mr. Walker records the date not only of his first violet, but also, still with an eye to practical questions, of his first gooseberry-tart and his last load of barley.

The part is particularly strong in zoological articles, the study of this subject having received considerable impetus in Chester by the establishment and rapid development of the Grosvenor Museum, in the management of which the Society has a controlling influence. The catalogue *raisonné* of the *Birds of West Cheshire, Denbighshire, and Flintshire*, by Dr. W. Henry Dobie, is a most carefully compiled list of records, in which is summarized the existing information, with full reference to the authority in each case, as to the actual occurrence of each bird found in the district. It also includes many facts bearing upon the comparative rarity and distribution of the species. It is remarkable, as Dr. Dobie says, considering the great variety of the land surface of the district, that the number of species recorded should not be larger.

Brockholes' list of "Birds observed in Wirral," which was published by the same Society in 1874, mentioned 163 good species. The present list includes some 60 more, giving a total of 223 species. Making every allowance for doubtful records, the inclusion or omission of which is always a matter of opinion, this is considerably below the average of the adjoining counties, Lancashire and Derbyshire. But the publication of this list cannot fail to result in the accession of much scattered information, and more careful observation in the future. With this in view we may mention that West Cheshire is defined, for the purposes of the Society, to be so much of the county as lies west of a line drawn south from Warrington. The list is accompanied by a map of the district, showing most of the places referred to, and the species of which specimens are to be found in the

Grosvenor Museum are indicated, whilst the present place of deposit of the specimens supporting some of the rarer records is duly set forth. Mr. R. Newstead, curator of the Grosvenor Museum, besides contributing a *Preliminary List of Mammals* of the district, which preserves many interesting observations, has a little monograph on *The Heron and Heronries of North Wales*, in which with a great amount of information from other sources, he has given the result of his own considerable research and experience. Of the twelve recorded Cheshire heronries, only three have been recently in existence. In North Wales, as might be expected, there are more, twelve (out of 19 recorded) being still in existence. We congratulate the Society on the production of a valuable contribution to local natural history.

Books, &c., Received.

"*Entomologist's Record and Journal of Varieties.*" "*Anneas de Sciencias Naturaes*" (Porto). "*Irish Naturalist.*" "*The Naturalist.*" "*Science Gossip.*" "*Revista Estomatológica*" (Madrid).

TO CORRESPONDENTS.

Subscriptions, Exchanges, Correspondence, Notes, Papers for Publication, and all other communications must be addressed to the Editors "British Naturalist," Warrington.

All Exchanges, Queries, &c., for insertion in the following number, must reach us not later than the end of the previous month. All Queries must bear the writer's name.

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Diptera.—*The author of "British Flies" (Diptera), Fred. V. Theobald, M.A., F.E.S., 12, Trumpington Street, Cambridge, will name specimens of Diptera sent to him for this purpose. He will also advise on the subject of injurious insects.*

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Lepidoptera.—*Mr. Eustace R. Bankes, M.A., F.E.S., The Rectory, Corfe Castle, Wareham, will name specimens of Lepidoptera sent to him for that purpose. Applicants must, however, send addressed label when requiring specimens returned.*

Mollusca: Marine and Terrestrial.—*Mr. B. Tomlin, The Green, Llandaff, will name specimens of the above Mollusca sent to him by subscribers for the purpose.*

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The Life History of a Sponge. R. Hanitsch, Ph.D. Plates.
Some Curious Aquatic Larvæ. Geo. Swainson, F.L.S. Plates.
Geology and Scenery of Killarney. Chas. White, Esq.
Sexual Distinction of Insects. C. W. Dale, F.E.S.
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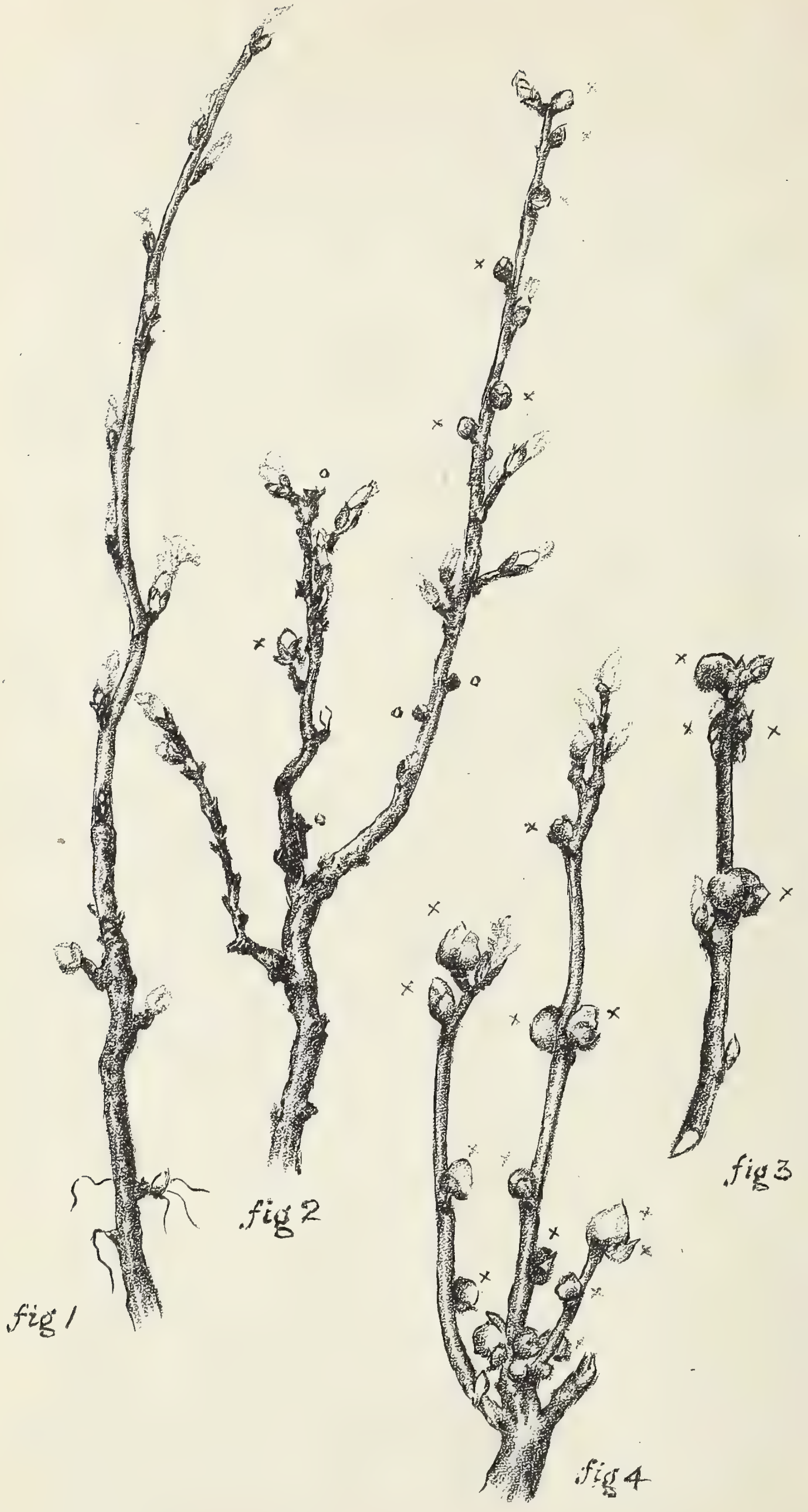
PLATE VIII.



The Currant Bud Mite (Phytoptus Ribi)

× Infested Buds.

THE

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THE BAND-VARIATION OF *HELIX NEMORALIS* AND *H. HORTENSIS* IN THE BRITISH ISLES.

BY T. D. A. COCKERELL, F.Z.S.

For some years past I have been collecting the records of the variation in the banding of these two species; and as no list of the "band-formulæ" observed in the British Isles has appeared, it may be of service to publish the following, which is, I think, almost or quite complete up to the time I left England. The records are scattered over the pages of several magazines, but it seems scarcely worth while to give full bibliographical references. I have accordingly been content to quote after each formula the name of the author who first published it, whether in England or abroad. A few marked "f. nov." appear not yet to have been published. The number of variations might be largely increased by taking into account the differences of colour, but I have not found much correspondence between colour and banding, except that shells of certain colours (*e.g.* lilac *H. hortensis*) are usually bandless. The banding differs greatly according to locality, and considerable difference is often to be observed in this respect between British and Continental examples. It is also to be noted that although *H. nemoralis* and *H. hortensis* are very closely allied, they differ much in their band-variation, and the former is decidedly more variable than the latter.

The "band-formula" method is very generally known, but it may be well to explain it briefly. The normal shell of either species has five bands. The formula for such a specimen is 12345. When a band is absent a cypher is substituted, thus, 10345. When a band is interrupted at intervals a colon takes the place, as 1:345. This character seems to be much more common on the Continent than in England. When a band is ill-developed it appears as a small figure below the line, as $1_{2}345$. When two or more bands are united, they are placed between brackets, thus, 1(23)45. When a band is split into two or more its figure is repeated, thus 123345. X is used for an extra band not clearly belonging to any of the normal five.

Helix Nemoralis, L.

12345	Moq. Tand.	000_{45}	f. nov.
10345	Moq. Tand.	$_{1}0300$	Ckll.
02345	Moq. Tand.	$_{1}23(45)$	Ckll.
12045	Moq. Tand.	$00_{3}(45)$	Ckll.
00345	Moq. Tand.	$0_{2}3(45)$	Ckll.
00045	Moq. Tand.	$0(_{2}3)(45)$	Ckll.
00305	Moq. Tand.	$(_{12}3_{45})$	Ckll.
00300	Moq. Tand.	$(12)_{3}(45)$	Wallis Kew
00000	Moq. Tand.	$(_{12})3(45)$	Ckll.
00340	Kreglinger.	$0_{23}(45)$	Ckll.
$1_{2}345$	Roebuck.	$_{12}3(45)$	Ckll.
$_{12}345$	F. Fenn.	$00(_{34}5)$	Ckll.
$_{1}2345$	Cockerell.	$0_{2}(34)_{5}$	Ckll.
$_{1}0345$	Ckll.	$(_{123}45)$	W. Kew.
$_{12}34_{5}$	f. nov.	$(_{12}345)$	W. Kew.
$_{12}3_{45}$	G. Roberts.	$(_{12345})$	W. Kew.
003_{45}	Ckll.	$_{1}2_{3}3(45)$	Roeb.
0030_{5}	Ckll.	$00_{3}3_{3}45$	Roeb.
00_{345}	Ckll.	$123_{x}45$	Ckll.
$003_{4}0$	Roeb.	$0_{2}3_{4455}$	Ckll.
$00_{3}00$	Ckll.	000(44)0	Ckll.*
0_{2345}	Ckll.	$003_{3}00$	Scott.
$023_{4}0$	Ckll.	123x45	Ckll.
$10_{3}45$	Ckll.	$00_{344}0$	Ckll.
$00_{34}5$	Roeb.	000(445)	f. nov.
$00_{3}45$	Ckll.	$_{123}(_{45})$	W. Kew.
$00_{34}0$	Ckll.	$(_{12})3(_{45})$	W. Kew.
$000_{4}5$	Ckll.	$(_{1}2)3(45)$	f. nov.
0034_{5}	Roeb.	1(23)345	f. nov.
$0_{2}345$	Wallis Kew.	$(_{12})_{3}00$	f. nov.
$12_{3}45$	Ckll.	$(123_{3}45)$	Milne.
$0_{2}34_{5}$	Ckll.	123(45)	Moq. Tand.
$_{12345}$	Moq. Tand.	1(23)(45)	Moq. Tand.
$_{123}00$	G. Roberts.	1(23)45	Moq. Tand.
$003_{4}5$	Ckll.	00(34)0	Taylor.

---

* The split band bracketed indicates a band which is split into two, but becomes joined near the mouth of the shell.

Helix Nemoralis, L.—*continued.*

003(45)	Moq. Tand.	000(45)	Moq. Tand.
(12)3(45)	Moq. Tand.	(1234)5	Borcherding.
(123)(45)	Moq. Tand.	00(345)	Kregl.
(12345)	Moq. Tand.	(:::::)	Ckll.
(12)345	Moq. Tand.	1(::::)	Ckll.
(123)45	Moq. Tand.	(::):::	Ckll.
023(45)	Kreglinger.	$0_{::}4_{:}$	Ckll.
1(2345)	Moq. Tand.	0::::	Locard.
120(45)	Kregl.	:::::	Moq. Tand.
0(2345)	Moq. Tand.		

Helix Hortensis, Müll.

00000	Moq. Tand.	${}_{12}345$	Ckll.
00300	Moq. Tand.	0234_{5}	Ckll.
12345	Moq. Tand.	$100_{4}5$	Ckll.
10345	Moq. Tand.	${}_{123}45$	f. nov.
10045	Locard.	$(12)34_{5}$	Ckll.
00345	Kregl.	$1_{2}3(45)$	Ckll.
00045	Ckll.	${}_{1}23(45)$	Ckll.
00040	S. C. Ckll.	$000({}_{45})$	Ckll.
12340	Roeb. and Taylor.	${}_{1}(23)45$	Williams.
00340	Locard.	$(12)3x_{x}(45)$	Ckll.
00305	S. C. Ckll.	${}_{1}0345_{x}$	Ckll.
10005	Kregl.	$123_{x}45$	Ckll.
00005	Locard.	(123)(45)	Kregl.
12045	Kregl.	(12)3(45)	Kregl.
0_{2345}	Ckll.	(12345)	Moq. Tand.
$0_{2}345$	Ckll.	123(45)	Moq. Tand.
${}_{1}0345$	f. nov.	(12)345	Moq. Tand.
$1_{2}345$	Ckll.	1(23)(45)	Moq. Tand.
${}_{12}34_{5}$	Ckll.	1(2345)	Kregl.
$103_{4}5$	Ckll.	(123)45	Kregl.
103_{45}	Ckll.	(1234)5	Kregl.
${}_{12345}$	Moq. Tand.	1(23)45	Moq. Tand.
$12_{3}45$	Ckll.	1(234)5	Roeb. and Taylor.
${}_{1}2345$	Ckll.	(12)045	Von Martens.
$1_{2}045$	f. nov.	12(345)	Moq. Tand.

THE CUCKOO: *CUCULUS CANORUS.*

BY PHILORNIS.

Whether our Neolithic ancestors were sufficiently intelligent to take an interest in this bird, or whether its harsh call only came to be regarded as a welcome signal of Spring at a much later time, cannot be decided. It is certain, however, that for many centuries the call of the cuckoo has been regarded as of good omen, and, more than a hundred years before Chaucer was born, our ancestors sang:

Sumer is icumen in,
  Lhude sing cuccu;
Groweth sed and bloweth med,
  And springeth the wde nu.
          Sing cuccu.

Awe bleteth after lombe,
  Lhouth after calve cu;
Bulluc sterteth, bucke verteth;
  Murie sing cuccu,
          Cuccu, cuccu.

  Wel singes thu, cuccu;
  Ne swik thu naver nu.

The joyousness of this song, now near 700 years old, will be shared by every healthy mind, when April brings back from Africa this noisy traveller, the herald of the new life that is bursting forth in leaf and flower, in the songs of birds and in the hum of bees.

Many and varied are the superstitions that have clustered round the cuckoo, the most immoral vagrant of the feathered tribe. The belief that in winter it was transformed into a sparrow-hawk has been very widely held, and probably arose from its general resemblance to one, both in shape, plumage, and flight. That it is really widely-separated from any of the hawk tribe it is perhaps scarcely necessary to point out; it is mainly a feeder on insects, and is unconsciously of immense service to man as a devourer of caterpillars. Whether the hairy caterpillars, which form a large part of its diet, irritate its stomach and so cause those manifestations of ill-nature, which are also exhibited by higher organisms when suffering from indigestion, or whether the greediness and ill-nature are due to some deeper cause, is perhaps doubtful.

Though caterpillars are the staple, they are not the exclusive food of the cuckoo; it occasionally takes a few berries by way of dessert. It will eat small beetles and spiders, and sometimes hawks at dragon-flies, whose strong and rapid flight cannot always save them from a foe not less greedy and cruel, and much more powerful than themselves.

According to an old belief, on first hearing the cuckoo in spring, one should promptly turn over such money as he has in his pockets, and thus ensure great increase of wealth before the year is out. Those persons who on first hearing the cuckoo have no money in their pockets are not unreasonably regarded as very unfortunate.

The cuckoo is included with the bats in the curious list of unclean birds (!) given in Leviticus xi. and Deuteronomy xiv.; there is, however, some doubt whether the Hebrew word so translated ought not rather to be rendered gull. Whatever be the correct interpretation, the cuckoo certainly occurs in Palestine, and ranges, in fact, over the greater part of Northern Asia and Europe in Summer, passing southwards in Winter. According to a north country rhyme :—

The cuckoo sings in April,
The cuckoo sings in May,
The cuckoo sings in June
And then flies away.

This, however, is erroneous, as, though the cuckoo's call is rarely heard after the middle of June, the birds do not leave us for several weeks afterwards, when they begin their southern journey, some passing on as far as the Cape of Good Hope. About half-a-dozen relatively small eggs—of a white ground colour, varying in tint from greyish to reddish, and speckled with brown—are laid at intervals of a day or two, usually on the ground, whence each is transferred by the beak to the nest of some bird which feeds its young with insects or larvæ. The young cuckoo speedily ejects from the nest of its foster-parents all the other nestlings, and if by chance two cuckoo's eggs have been placed and hatched in the same nest, the young cuckoos will struggle with back and wings until one has been forced over the edge of the nest, leaving the successful combatant to profit by the assiduous care of its foster-parents, who rarely, if ever, realize that they have reared an interloper. The most frequent victim of this immoral habit of the cuckoo is the hedge-sparrow; but its eggs have been occasionally found in the nests of other birds, as for instance, the wagtail, tit-lark, robin, yellow-hammer, green-linnet, and sedge warbler. The nestling cuckoo's habit of lifting the other young birds and eggs from the nest seems to be only another manifestation of that deep-seated constitutional tendency which makes the adult birds greedy, peevish and unsocial; which, in physiological phrase, is due to predominant katabolism, and which in the species (as distinct from individuals) produces a much larger number of males than females.

No one whose judgment on the bird is based on adequate knowledge of its habits will think favourably of the cuckoo; and though the beauties of Spring-time, with which its arrival is associated, may justify considerable poetic licence, Wordsworth was scarcely very familiar with the real character of the cuckoo, or he would not have written :—

O blessed bird! the earth we pace
Again appears to be,
An unsubstantial fairy place
That is fit home for thee!

THE SEXUAL DISTINCTION OF INSECTS.

BY C. W. DALE, F.E.S.

In a great number of species the differences between the sexes are so slight as to be hardly discernible, except on an examination of the abdomen; still, in a large number there is a most remarkable difference, whether in form, size, or colour.

I.—Disparity of Colour.

The sexes of Butterflies, though generally resembling each other, occasionally offer various distinctions, the males in such cases being almost invariably the most gaily coloured. This is especially the case with the Purple Emperor, the Blues, and the Coppers. In these, the upper side alone offers this distinction; the Orange-tip, however, has the tips of the fore-wings coloured orange on the under side as well as on the upper. On the other hand, in the Purple Hairstreak, the individuals which have a bright purple patch on the upper surface of the wings—and are the most beautiful—are the females; as is also the case with the Brown Hairstreak, except that in this species the patch is of a dull orange. The female of the Brimstone is of a much whiter yellow than her consort. The female of the Clouded Yellow differs from the male by having spots in the margin; it has, moreover, a variety called Helice, which is of a dull greenish yellow. Argynnis Paphia has also two forms of the female, one which closely resembles the male, a second of a dark greenish brown called Valezina. I will now enumerate the British species of butterflies the sexes of which can be distinguished from each other by colour differences:—

G. Rhamni, male bright, female whitish brimstone.
C. Edusa, female by spots in the margin.
C. Cardamines, males by an orange blotch.
L. Sinapis, male by having blacker tips to the fore-wings.
P. Brassicæ, rapæ, and napi, by female having black spots on the fore-wings.
T. Betulæ, female by a dull orange patch.
T. Pruni, female has a tawny fascia.
T. W. album, male has an ovate glabrous spot on fore-wings.
T. Rubi, male has an ovate white or black spot on fore-wings.
T. Quercus, female by a purple patch.
C. Dispar, male bright copper, female darker and more spotted.
P. Argiolus, female by a black border to the fore-wings, which is of a deeper width in the summer than in the spring brood.
P. Arion, female by having the black spots on the fore-wings of a larger size than the male.

P. Corydon, male silvery blue, female light brown.
P. Adonis, male sky blue, female light brown.
P. Alexis, male lilac blue, female light brown.
The females of these three species are exceedingly variable, and some of them closely resemble the male in colour.
P. Ægon, male lilac blue, female light brown. Some females more resemble the male colour.
P. Acis, male lilac blue, female bluish brown.
P. Alcis, male bluish brown, female dull brown.
H. Semele, female by a distinct broad cream-coloured band.
S. Ægeria, female by the spots being larger and more numerous.
S. Megæra, male by a broad brown oblique streak on the fore-wings.
S. Tithonus, male by a broad brown oblique patch in the centre of the fore-wings.
S. Janira, female by a fulvous patch towards the tips of the forewings.
S. Hyperanthus, female by the larger and more distinct spots.
E. Medea, female by the larger and more distinct spots.
A. Iris, male by a splendid glow of changing purple.
A. Paphia, male by black longitudinal ribs on the fore-wings.
A. Aglaia, Adippe, Lathonia, Euphrosyne, and Selene, females by being darker and more spotted.
H. Sylvanus, Linea, Comma, Lineola, and Actæon, males by a black streak on fore-wings.

Now let us proceed to the moths.

First of all, we have a most wonderful colour difference in the sooty black male and snowy white female of Arctia mendica. Next Lithosia quadra offers great dissimilarity, the wings of the male being of a dull grey, with a yellow base, those of the female of a deep yellow with two conspicuous black spots. Quite as wonderful a difference as in these two may be seen in Hepialus humuli, the male being of a snowy white, the female of a deep dull yellow. In Hepialus hectus also there is a great difference, the male being of a dull orange with conspicuous white spots, the female of a pale brown, with indistinct spots. Another great difference may be seen in Liparis dispar, the male of which is smoky brown, the female yellowish white.

The other Bombyces in which colour difference is discernible are:—

Lithosia helveola, female much darker than the male.
Bombyx quercus, male rich chocolate brown, female pale yellow.
Bombyx rubi, male reddish brown, female purplish brown.
Bombyx castrensis, male pale ochreous, female reddish brown.
Trichiura cratægi, female of a much lighter grey than male.
Odonestis potatoria, male dull reddish yellow, female of a deep pale yellow.

Orgyia pudibunda, female of a paler grey than the male.

Saturnia carpini, male fore-wings of a rosy brown, hind-wings of a dull orange; female of a soft grey.

Endromis versicolora, male hind-wings of a dull orange, female hind-wings of a dull white.

Limacodes asellus, male of a chocolate brown, female of a pale yellow.

Hepialus lupulinus, sylvinus, and velleda, females are paler and more indistinctly spotted than the males.

Drepana hamula and falcula, females are of a much lighter shade than the males.

Amongst the Geometræ great differences may be seen in :—

Epione vespertaria, male dull orange, female whitish yellow.

Fidonia piniaria, male white or yellowish white, female yellow in Scotland, grey in Norfolk.

Fidonia atomaria, female much lighter than the male.

Scodiona belgiaria, female much darker than the male.

Camptogramma fluviata, male ochreous, female reddish grey. Hübner described the sexes as different species under the names of fluviata and gemmata.

Coremia didymata, female much lighter than the male.

Acidalia emarginata, female with a dark bar across the wings.

Amongst the Noctuæ the greatest difference is in the hind-wings, those of the males being white, those of the females brown; but this is only confined to a few species.

Amongst the Pyralides differences may be seen in the following :—

Cataclysta lemnalis, male fore-wings white, female fore-wings pale brown.

Cledeobia augustalis, male dark brown, female pale reddish brown.

Amongst the Crambites in :—

Schœnobius gigantellus, male fore-wings brownish grey with black dots, female fore-wings reddish grey, unspotted, and entirely white hind-wings.

Chilo phragmitellus, female much lighter than the male.

Crambus paludellus, female much lighter than the male.

Platytes cerussellus, male brown, female white.

Melia sociella, male has the basal half of the wing white, female has the second spot larger and round.

In the Neuroptera, we find distinctions in Libellula depressa and a few others. The males of L. depressa and of L. cœrulescens have blue bodies, the females yellow bodies. The males of Agrion pumilio and allies have red bodies, the females aeneous bodies. Agrion tenellum, at least, has two sorts of females, one of which has no red at the base of abdomen. The males of Lestes pennipes have blue bodies, the females have grey bodies. The females of Anax formosus, Cordulia Curtisii, and a few others have much darker wings than the males.

A more wonderful difference, though, is seen in the wings of the genus Calopteryx, those of the male being of a most splendid metallic blue, of the female a very pale light brown. The males of Clocon dipterum have black bodies, the females red bodies. The females of Clocon luteolum have red bodies; the males are red at the thorax and at the tip of the abdomen, the intervening space being filled up with a most delicate white with very thin red base. Similar distinctions exist in others of the Mayflies.

In Hymenoptera we find distinctions in :—

Anthophora retusa and pilipes, males of a fulvous brown, females entirely clothed with black hairs.

Andrena fulva, male with black abdomen, female with abdomen clothed with bright fulvous hair.

Distinctions exist in others of the genus Andrena :—

Methoca ichneumonida and Myrmosa melanocephala, males entirely black, females black and red.

Pompilus notatus, male with black abdomen with a red ring and red legs, female with red abdomen and black legs.

Pompilus exaltatus, male with plain, female with variegated wings.

Pompilus hyalinatus, male with plain wings, black abdomen, and red legs; female with variegated wings, red abdomen, and black legs.

Sirex juvencus, with a metallic red abdomen, female with metallic blue abdomen.

Sirex gigas, male with a reddish yellow abdomen, female with a pale yellow abdomen banded in the middle with black.

Lophyrus rufus, male with a black abdomen, female with a red abdomen.

Lophyrus pini, male with a black abdomen, female with a yellow abdomen banded in the middle with black.

Ichneumon sarcitorius, male with whitish yellow bands on the abdomen, female with red bands on the abdomen. They have been described as different species under the names of sarcitorius and vaginatorius.

Similar differences exist in other species of the Ichneumonidæ.

In Diptera we find distinctions in :—

Sargus bipunctatus, male with a bronzy green abdomen, female with a blue abdomen, the first and second segments being of a reddish tawny.

Sargus infuscatus, male with a green, female with a blue abdomen.

Oxycera rara, pardalina, and formosa, females have yellow stripes on the thorax, which the males have not.

Oxycera Morisii and longicornis, females have yellow spots on the head, which the males have not.

(Oxycera analis and terminata, both sexes of same colour.)

Oxycera trilineata and muscaria, females have yellow collars, which the males have not.

Nemotelus uliginosus and pantherinum, males have a large white patch on the abdomen, which the females have not.

Odontomyia argentata, male is clothed with silvery down on the abdomen, the female is not.

Chrysops cæcutiens, male black, and with very black wings, female with a large yellow patch on the abdomen, and with lighter wings.

Thereva anilis, male clothed with white down on the abdomen, the female is not.

Atherix ibis, male is fulvous on the abdomen, the female is not.

Empis livida, male has dark, female light, wings.

Platypeza rufa, male has dark, female has light, wings.

Platypeza modesta, picta, aterrima, infumata, and fumipennis, males have drab wings and black abdomen, females have light wings and grey abdomen.

Eristalis intricarius, male clothed with fulvous hair on the abdomen, female with abdomen black with a white tip.

Phasia subcoleoptrata, male with plain wings, female with dark mottled wings.

Musca maculata, male with fulvous red on the abdomen, female with grey on the abdomen.

Bibio hortulanus, anglicus, and ferruginatus, males are black, females reddish yellow.

Bibio marci, and leucopterus, males have light wings, females very dark wings.

Dilophus vulgaris, male has light wings, female very dark wings. I have a hermaphrodite with one wing light, the other dark.

Tipula lutescens, male has light wings, female yellowish wings.

In the Hemiptera we find another colour difference; for in the male of Metatropis rufescens the knobs of the antennæ and of the legs are black, whilst in the female they are red.

(*To be continued.*)

PART II.—Synonymic List of the GENERA of the British ARANEIDEA.

BY THE REV. F. O. PICKARD-CAMBRIDGE, M.A.

FAMS :	SUB. FAMS.	GENERA.	PUBLICATION.
Araneæ Theraphosæ.			
Atypidæ			
		ATYPUS, *LATR., 1804.*	
		Atypus,—*Blackw., 1861.*	Spid. Gt. Bt. Ir., p. 14.
		,, *Cambr. 1879-81.*	Spid. Dor., vol. i., p. 2.
Araneæ Veræ Cribellatæ.			
Uloboridæ			
	Uloborinæ	ULOBORUS, *LATR. 1806.*	
		Veleda, *Blackw. 1859, 1861.*	Spid. Gt. Bt. Ir., p. 150.
		Uloborus,—*Cambr. 1879-81.*	Spid. Dor., ii., p. 284.
		Uloborus,—*Sim. 1874.*	Ar. Fr., vol. i., p. 165.
	Miagrammopinæ	HYPTIOTES, *WALCK. 1833.*	
		Mithras.—*Blackw. 1864.*	A.M.N.H., 1862, 1864.
		Hyptiotes,—*Cambr. 1879-81.*	Spid. Dor., ii., p. 532.
		Hyptiotes,—*Sim. 1874.*	Ar. Fr., vol. i., p. 172.
Dictynidæ			
		AMAUROBIUS, *C. KOCH, 1837.*	
		Ciniflo, *Blackw. 1846, 1861* in pt.	Spid. Gt. Bt. Ir., p. 139.
		Amaurobius,—*Camb. 1879-81* ,,	Spit. Dor. i., p. 53.
		,, ,—*Sim. 1874.* ,,	Ar. Fr., vol. i., p. 220.
		DICTYNA, *SUND. 1833.*	
		Ergatis, *Blackw. 1841; 1861.*	T.L.S., xviii., 1841, p. 608.
		Clubiona,— ,, *1833.* in part.	L.&Ed. Phil. Mag. 3, iii. p. 437.
		Drassus,— ,, *1884.* ,,	Reschs. in Zoology, p. 337.
		Operaria,— ,, *1840.*	T.L.S., 1840, p. 68.
		Ergatis,—*Cambr. 1861.*	Zoologist, 1862, p. 7960.
		Dictyna,— ,, *1879-81.*	Spid. Dor., i., p. 48.
		,, ,—*SIM. 1874.*	Ar. Fr., vol. i. p. 177.
		PROTADIA, *SIM. 1892.*	
		Lethia,—*Cambr. 1879-81,* in pt.	Spid. Do. vol. ii. pp. 467 and 470.
		Ciniflo,— ,, *1873.* ,,	T.L.S., xxviii, p. 441.
		Drassus,—*Cambr. 1861.* ,,	A.M.N.H., June 1861.
		Dictyna,—*Sim. 1870.* ,,	Ar. Fr., vol. 1, p. 197.

Araneæ Veræ Cribellatæ.

FAMS.:	SUB. FAMS.	GENERA.	PUBLICATION.
Dictynidæ. (*Continued.*)			
		LATHYS, *SIM. 1884.*	
		Ciniflo,—*Blackw. 1885,* in part.	Spid. Gt. Bt. Ir., p. 145.
		Amaurobius,—*Camb. 1872.* in pt.	
		Drassus,—*Cambr. 1870.* in part.	T.L.S., xxviii. p. 439.
		Lethia,—*Cambr. 1879-81.* ,,	Spid. Dor. i., p. 51.
		Ciniflo,—*Cambr. 1870.* ,,	T.L.S., xxviii. p. 441.
		Lethia,—*Sim. 1874*	Ar. Fr. vol, i., p. 199.
		Lathys, *Sim. 1884 ; 1894.*	Bull. Soc. Zool. Fr., 1884, p. 321.
		ALTELLA, *SIM. 1884.*	
		Lethia,—*Cambr. 1879-81.* in pt.	Spid. Dor., ii., p. 468.
		Amphissa,—*Cambr. 1882.*	A.M.N.H., 5, ix., p. 2.
		Altella,—*Sim. 1884.*	Bul. Soc. Zool. Fr., 1884, p. 321.
Eresidæ			
		ERESUS, *WALCK. 1805.*	
		Eresus,—*Blackw. 1861.*	Spid. Gt. Bt. Ir., p. 45.
		,, —*Cambr. 1879-81.*	Spid. Dor., i., p. 45.
		,, —*Sim. 1892.*	Hist. Nat. Ar., p. 254.

Araneæ Veræ Ecribellatæ.

Sicariidæ			
	Scytodinæ	SCYTODES, *LATR. 1804.*	
		Scytodes,—*Blackw. 1861.*	Spid. Gt. Bt. Ir. p. 379.
		,, ,—*Cambr. 1879-81.*	Spid. Dor., i. p. 75.
		,, ,—*Sim. 1893.*	Hist. Nat. Ar., p. 276.
Oonopidæ			
		OONOPS, *TEMPL. 1834.*	
		Deletrix, *Blackw. 1837.*	L.Ed. Phil. Mag. x. p.100
		Oonops,— ,, *1861.*	Spid. Gt. Bt. Ir. p. 377.
		,, ,—*Cambr. 1879-81.*	Spid. Dor. i. p. 9.
		,, ,—*Sim. 1893.*	Hist. Nat. Ar., p, 294.
Dysderidæ			
	Dysderinæ.	DYSDERA, *LATR. 1804,*	
		Dysdera,—*Blackw. 1861.* in part.	Spid. Gt. Bt. Ir., p. 369.
		,, ,—*Cambr. 1879-81.*	Spid. Dor. i., p. 5.
		,, ,—*Sim, 1893.*	Hist. Nat. Ar., p. 317.
		HARPACTES, *TEMPL. 1834.*	
		Dysdera,—*Blackw. 1861.* in part.	Spid. Gt. Bt. Ir., p. 371.
		Harpactes,—*Cambr. 1879-81.*	Spid. Dor. i., p. 6.
		,, ,—*Sim. 1893.*	Hist. Nat. Ar., p. 318.
	Segestriniæ.	SEGESTRIA, *LATR. 1804.*	
		Segestria,—*Blackw. 1861.*	Spid. Gt. Bt. 1r., p. 373.
		,, ,—*Cambr. 1879-81.*	Spid. Dor. i., p. 7.
		,, ,—*Sim. 1893.*	Hist. Nat, Ar., p. 321.

Araneæ Veræ Ecribellatæ.

(*Continued.*)

FAMS.: SUB. FAMS.	GENERA.	PUBLICATION.
Leptonetidæ		
	*SCHŒNOBATES, *BLACKW. 1850*	
	Schœnobates, *Blackw. 1861.*	Spid. Gt. Bt. Ir., p, 376.
	,, ,—*Cambr. 1879-81.*	Spid. Dor. ii., p. 458.
	? Psiloderces, *Sim. 1892.*	Ann. Soc. Ent. Fr. 1892, p. 40.
Drassidæ		
Drassodinæ		
Drassodeæ	DRASSODES, *WESTR., 1851.*	
	Drassus,—*Blackw. 1861,* in part	Spid. Gt. Ir., p. 104.
	,, ,—*Cambr. 1879-81,* in pt.	Spid. Dor., i., p. 16.
	,, ,—*Sim. 1878.*	Ar. Fr., iv., p. 101.
Echeneæ	PHÆOCEDUS, *SIM. 1893.*	
	Drassus,—*Cambr. 1874,* in part.	P.Z.S., 1874, p. 386.
	,, ,— ,, *1879-81.* in pt.	Spid. Dor., ii., p. 570.
	,, , *Sim. 1879,* in part.	Ar. Fr., iv., p. 136.
	Phæocedus,—*Sim. 1893.*	Hist. Nat. Ar., p. 370.
	MELANOPHORA, *C. KOCH, 1833.*	
	Drassus,—*Blackw. 1861,* in part.	Spid. Gt. Bt. Ir., p. 104.
	Prosthesima,—*Cambr. 1879-81.*	Spid. Dor., i., p. 14.
	,, ,—*Sim. 1878,* in part	Ar. Fr., iv., p. 52.
	Melanophora,—*Sim, 1893.*	Hist. Nat. Ar., p. 373.
Gnaphoseæ	GNAPHOSA, *LATR., 1804.*	
	Drassus,—*Blackw. 1861,* in part.	Spid. Gt. Bt. Ir., p. 105.
	,, ,—*Cambr. 1870.* ,,	T.L.S., xxvii., p. 419.
	Gnaphosa,— ,, *1879-81.*	Spid. Dor., i. p. 13.
	,, ,—*Sim 1878.*	Ar. Fr., iv., p. 163.
Pholcidæ		
	PHOLCUS, *WALCK, 1805.*	
	Pholcus,—*Blackw. 1861.*	Spid. Gt. Bt. Ir., p. 208.
	,, ,—*Cambr. 1879-81.*	Spid. Dor., Vol. i., p. 76.
	,, ,—*Sim, 1893.*	Hist. Nat. Ar., Vol. i., p. 470.
Theridionidæ		
Section 1.		
Theridionini	NESTICUS, *THOR. 1870.*	
	Linyphia,—*Blackw. 1861,* in pt.	Spid. Gt. Bt. Ir., p. 224.
	Nesticus,—*Cambr. 1879-81.*	Spid. Dor., vol. i., p. 93.
	,, ,—*Sim. 1881.*	Ar. Fr., v., p. 45.
	THERIDION, *WALCK. 1805.*	
	Theridion,—*Blackw. 1861.* in pt.	Spid. Gt. Bt. Ir., p. 175.
	,, ,—*Cambr. 1879-81.*	Spid. Dor. vol. i, p. 82.
	Phyllonethis, — *Camb. 1879-81.* in part.	Spid. Dor., vol. i., p. 94.
	Theridion,—*Sim. 1881.*	Ar. Fr. vol. v., p. 49.

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* It is very doubtful what may be the correct position of this genus, since the type has long ago been lost. Specimen probably imported.

Araneæ Veræ Ecribellatæ.

Theridionidæ

Section I.

Theridionini

(*Continued.*)

FAMS.: SUB. FAMS.	GENERA.	PUBLICATION.
	DIPŒNA, *THOR. 1870.*	
	Theridion,—*Cambr. 1863,* in pt.	Zoologist, 1863, p. 8596.
	Dipœna,— „ *1879-81.*	Spid. Dor., vol. i., p.478.
	,, ,— *Sim. 1881.*	Ar. Fr. vol. v., p. 114.
	EURYOPIS, *MENGE. 1868.*	
	Theridion,—*Blackw. 1861,* in pt.	Spid. Gt. Bt. Ir., p. 201.
	Euryopis,—*Cambr. 1879-81.*	Spid. Dor. vol. i., p. 99.
	„ ,—*Sim. 1881.*	Ar. Fr., vol. v., p. 121.
	PHOLCOMMA, *THOR. 1870.*	
	Theridion,—*Cambr. 1862,* in pt.	Zoologist, 1862, p. 7962.
	Pholcomma,—*Cambr. 1879-81.*	Spid. Dor. vol. 1, p. 81.
	,, ,—*Sim. 1881.*	Ar. Fr. vol v, p 134.
	LASEOLA, *SIM. 1881.*	
	Theridion,—*Blackw. 1861,* in pt.	Spid. Gt. Bt.Ir., p. 196.
	,, ,—*Cambr. 1861.* ,,	A.M.N.H., June, 1861.
	Steatoda,—*Camb. 1870.* in pt.	T.L.S., xxvii., p. 422.
	Euryopis,— ,, *1879-81.*	Spid Dor. vol. i. p. 99.
	Laseola, *Sim. 1881.*	Ar. Fr. vol. v., 136.
	STEATODA, *SUND. 1833.*	
	Theridion,—*Blackw. 1861.* in pt.	Spid. Gt. Bt. Ir. p. 177.
	Steatoda,—*Cambr. 1879-81.* ,,	Spid Dor. vol. i p. 96.
	,, ,—*Sim. 1881.*	Ar. Fr. vol. v. p. 152.
	CRUSTULINA, *MENGE. 1868.*	
	Theridion,—*Blackw. 1861.* in pt.	Spid. G. Bt. Ir. p. 196.
	,, ,—*Camb.* ,,	A.M.N.H. 3, vii., p. 432.
	Steatoda,— ,, *1879-81.* ,,	Spid. Dor. vol. i., pp. 97, 99.
	Crustulina,—*Sim. 1881.*	Ar. Fr. vol. v., p. 156.
	TEUTANA, *SIM. 1881.*	
	Theridion,—*Blackw. 1861.* in pt.	Spid. Gt. Bt Ir. p. 119.
	Steatoda,—*Camb. 1879-81.* ,,	Spid. Dor. vol. ii., p. 479
	Teutana,— ,, *1891.*	P.D.N.H.S. xii., p. 88.
	,, , *Sim. 1881.*	Ar. Fr. vol. v., p. 161.
	ASAGENA, *SUND. 1833.*	
	Theridion,—*Blackw. 1861.* in pt.	Spid. Gt. Bt. Ir. p. 205.
	Asagena,—*Cambr. 1879-81.*	Spid. Dor. vol. i. p. 101.
	,, ,—*Sim. 1881.*	Ar. Fr. vol. v., p. 171.
	EPISINUS, *LATR. 1809.*	
	Theridion,—*Blackw. 1861.* in pt.	Spid. Gt. Bt. Ir., p. 202
	Episinus,—*Cambr. 1879-81.*	Spid. Dor. vol. i., p. 80
	,, ,—*Sim. 1881.*	Ar. Fr. vol. v., p. 40.

Araneæ Veræ Ecribellatæ.

(Continued.)

FAMS.:	SUB. FAMS.	GENERA.	PUBLICATION.
Section 2. Erigonini.			
	Div. 1. Enoplognathini	ENOPLOGNATHA, *PAV. 1880.*	
		Neriene,—*Cambr. 1879-81.* in pt.	Spid. Dor., vol. i., p. 122.
		Enoplognatha,—*Cambr. 1889.*	P.D.N.H.S. X., p. 114.
		,, ,—*Sim. 1884.*	Ar. Fr., vol. v., p. 182.
		PEDANOSTETHUS, *SIM. 1884.*	
		Neriene,—*Blackw. 1861.* in pt.	Spid. Gt. Bt. Ir. p. 252.
		,, ,—*Cambr. 1879-81.* in pt.	Spid. Dor., vol. i., pp. 121-122.
		Pedanostethus, *Sim. 1884.*	Ar. Fr., vol. v., p. 195.
		ROBERTUS, *CAMBR. 1879.*	
		Neriene,—*Cambr. 1879-81.* in pt.	Spid. Dor., vol. i., p. 136.
		Robertus, ,, *1879-81.*	,, ,, p. 103.
	Div. 2. Linyphini	TAPINOPA, *WESTR. 1851.*	
		Linyphia,—*Blackw. 1861.* in pt.	Spid. Gt. Bt. Ir., p. 227.
		Tapinopa,—*Cambr. 1879-81.* ,,	Spid. Dor., vol. i., p. 176.
		,, ,—*Sim. 1884.*	Ar. Fr., vol. v., p. 202.
		FLORONIA, *SIM. 1887.*	
		Linyphia,—*Blackw., 1861.* in pt.	Spid. Gt. Bt. Ir., p. 228.
		,, ,—*Cambr. 1879-81.* ,,	Spid. Dor., vol. i. p. 179.
		Frontina, *Sim. 1884.*	Ar. Fr., vol. v., p. 206.
		BOLYPHANTES, *C. KOCH, 1837.*	
		Linyphia,—*Blackw. 1861.* in. pt.	Spid. Gt. Bt. Ir., p. 226.
		,, ,—*Cambr. 1879-81.* ,,	Spid. Dor. vol. i., p. 194.
		Bolyphantes,—*Sim, 1884.*	Ar. Fr. vol. v., p. 209.
		DRAPETISCA, *MENGE, 1866.*	
		Linyphia,—*Blackw. 1861.* in pt.	Spid. Gt. Bt. Ir., p. 222.
		,, ,—*Cambr. 1879-81.* ,,	Spid. Dor., vol. 1. p.193.
		Drapetisca,—*Sim. 1884.*	Ar. Fr., vol. v., p. 217.
		STEMONYPHANTES, *MENGE, 1866.*	
		Neriene, —*Blackw. 1861,* in part.	Spid. Gt. Bt. Ir., p. 279.
		Linyphia,—*Cambr. 1879-81* ,,	Spid. Dor., vol. i., p. 224
		,, ,—*Sim. 1884.* ,,	Ar. Fr., vol. v., p. 223.
		LINYPHIA, *LATR. 1804.*	
		Linyphia,—*Blackw. 1861,* in pt.	Spid. Gt. Bt. Ir., p. 220.
		,, ,—*Cambr. 1879-81,* ,,	Spid. Dor., vol. i., p. 177.
		Neriene,—*Blackw. 1861,* ,,	Spid. Gt. Ir., p. 249.
		Linyphia,—*Sim. 1884,* ,,	Ar. Fr., vol. v., p. 219.
		LABULLA, *SIM. 1884.*	
		Linyphia,—*Blackw. 1861,* in pt.	Spid. Gt. Bt. Ir. p. 220.
		,, ,—*Cambr. 1879-81,* ,,	Spid. Dor., vol. i., p. 180
		Labulla, *Sim. 1884.*	Ar. Fr., vol. v., p. 261.

Araneæ Veræ Ecribellatæ.

FAMS. :	SUB. FAMS.	GENERA.	PUBLICATION.
Div. 2. **Linyphini** (*Continued.*)			
		TARANUCNUS, *SIM. 1884.*	
		Linyphia,—*Cambr.1879-81,*in pt	Spid. Dor., vol. i.. p. 191
		Taranucnus, *Sim. 1884.*	Ar. Fr., vol. v., p. 248.
		LEPTYPHANTES, *MENGE. 1866*	
		Linyphia,—*Blackw. 1861,* in pt.	Spid.Gt.Bt.Ir., p.218,etc
		,, ,—*Cambr. 1879-81,* ,,	Spid.Dor.,vol.i.,p.184 etc
		Leptyphantes,—*Sim. 1884.*	Ar. Fr., vol. v., p. 265.
		BATHYPHANTES, *MENGE, 1866*	
		Neriene,—*Blackw. 1861,* in part.	Spid. Gt. Bt. Ir., p. 282.
		Theridion,— ,, ,, ,,	,, ,, p. 206.
		Linyphia,— ,, ,, ,,	,, ,, p. 244, etc.
		,, —*Cambr. 1879-81.* ,,	Spid. Dor. i., p. 188, etc.
		Bathyphantes,—*Sim. 1884.*	Ar. Fr., vol. v., p 330.
		PORRHOMMA, *SIM. 1884.*	
		Neriene,—*Blackw. 1861.* in pt.	Spid. Gt. Bt. Ir., p. 261, etc.
		,, ,—*Cambr. 1879-81.* ,,	Spid. Dor., vol. ii. p. 441.
		Linyphia,— ,, ,, ,,	,, ,, ,, p. 521.
		Erigone,— ,, *1879.* ,,	A.M.N.H., 5. iv., p. 210.
		Porrhomma, *Sim. 1884.*	Ar. Fr., vol. v., p. 353.
		OREONETA, *KULCZ, 1894.*	
		Porrhomma,—*F. Cb. 1894.*	A.M.N.H., 6. xiii., p. 94.
		Tmeticus,—*F. Cb. 1891.* ,,	,, 6. vii., p. 80.
		Porrhomma, *Sim. 1884.* in part.	Ar. Fr., vol. v., p. 369.
		OPISTOXYS, *SIM. 1884.*	
		Opistoxys,—*Cambr. 1891.*	P.D.N.H.S., xii. p. 92.
		,, , *Sim. 1884.*	Ar. Fr., vol. v., p. 372.
		HILAÏRIA, *SIM. 1884.*	
		Neriene,—*Cambr. 1879-81.* in pt.	Spid. Dor., vol. ii., pp. 433-487.
		Hilaira, *Sim. 1884.*	Ar. Fr., vol. v. p. 374.
		TMETICUS, *MENGE. 1866.*	
		Neriene,—*Blackw. 1861.* in pt.	Spid. Gt. Bt. Ir., p. 254, etc.
		Linyphia,— ,, ,, ,,	Spid. Gt. Bt. Ir. p. 287, etc.
		Walckenaera,—,, ,, ,,	Spid. Gt. Bt. Ir. p. 292.
		Linyphia,—*Cambr. 1879-81.* ,,	Spid. Dor., vol. i., p. 207, etc.
		Neriene,— ,, ,, ,,	Spid. Dor., vol. i., p. 129, etc.
		Walckenaera,—,, ,, ,,	Spid. Dor., vol. ii. p. 504.
		Tmeticus,—*F. Cb. 1892.* ,,	A.M.N.H. 6, X. p. 384.
		,, ,—*Sim. 1884.*	Ar. Fr., vol. v., p. 378.

Araneæ Veræ Ecribellatæ.

FAMS.: SUB. FAMS.	GENERA.		PUBLICATION.
Theridionidæ **Div. 2.** **Linyphini** *(Continued.)*			
	PEDINA, *MENGE, 1866.*		
	Linyphia,—*Camb. 1879-81.*	in pt.	Spid. Dor., vol. ii., p. 520.
	Tmeticus,— ,, *1889*	,,	P.D.N.H.S. x., p. 115.
	,, ,—*Sim. 1884*	,,	Ar. Fr., vol. v., 385.
	HILLHOUSIA, *F. CB. 1894.*		
	Linyphia,—*Cambr. 1879-81.*	in part.	Spid. Dor., vol. ii., p. 454.
	Leptyphantes,—*Cambr. 1889.*	in part.	P.D.N.H.S. X. p. 27.
	Leptyphantes,—*Sim.* 1884.	in pt.	Ar. Fr., vol. v., p. 321.
	Hillhousia, *F. Cb. 1894.*		A.M.N.H. 6. xiii., p. 89
	MICRONETA, *MENGE, 1868.*		
	Neriene,—*Blackw. 1861.*	in pt.	Spid. Gt. Bt. Ir., p. 256. etc.
	,, ,—*Cambr. 1879-81.*	,,	Spid. Dor., vol. i., p. 129. etc.
	Microneta,—*F. Cb. 1891.*		A.M.N.H., 6, vii., p. 85.
	,, ,—*Sim. 1884.*		Ar. Fr., vol. v., p. 421.
	SINTULA, *SIM. 1884.*		
	Neriene,—*Blackw. 1861.*	in pt.	Spid. Gt. Bt. Ir., p 273.
	,, ,—*Cambr. 1879-81.*	,,	Spid. Dor., vol. ii., p. 430 etc.
	Linyphia,— ,, ,,	,,	Spid, Dor., vol. i., p. 211. etc.
	Erigone,— ,, *1875.*	,,	P.Z.S., p. 331. 1875.
	Leptyphantes,—F.Cb.	,,	A.M.N.H.,6, x., p. 386.
	Sintula, *Sim. 1884.*		Ar. Fr., vol. v., p. 442.
Div. 3. **Lophocarenini** **Group 1.** **Gonatini**	GONGYLIDIUM, *MENGE, 1867.*		
	Neriene,—*Blackw. 1861.*	in pt.	Spid. Gt. Bt, Ir., p. 297. etc.
	,, ,—*Cambr. 1879-81.*	,,	Spid. Dor., vol. i., p. 117. etc.
	Coryphæus,—*F. Cb., 1894.*	in pt.	A.M.N.H. 6. xiii., p. 87.
	Gongylidium,—*Sim. 1884.*		Ar. Fr., vol. v., p. 470.
	TISO, *SIM. 1884.*		
	Neriene,—*Blackw., 1861.*	in pt.	Spid. Gt. Bt. Ir., p. 257.
	,, ,—*Cambr. 1879-81*	,,	Spid. Dor., vol. i., p. 110.
	Tiso, *Sim, 1884.*		Ar. Fr., vol. v., p. 506.
	ERIGONE, *AUD. IN SAV. 1825-27.*		
	Neriene,—*Blackw. 1861.*	in pt.	Spid. Gt. Bt. Ir., p. 274.
	,, ,—*Cambr. 1879-81.*	,,	Spid. Dor., vol. i., p. 106.
	Hillhousia, *F.Cb. 1894.*	in part.	A.M.N.H., 6. xiii., p. 89.
	Erigone,—*Sim. 1884.*		Ar. Fr., vol. i. p. 512.

Araneæ Veræ Ecribellatæ.

FAMS. :	SUB. FAMS.	GENERA.	PUBLICATION.
Div. 3. Lophocarenini	**Group I.** **Gonatini** (*Continued.*)		
		LOPHOMMA, *MENGE. 1867.*	
		Walckenaera,—*Blackw. 1861.* in part.	Spid. Gt. Bt. Ir. p. 295.
		Walckenaera,—*Cambr. 1879-81.* in part.	Spid. Dor., vol. i., p. 148.
		Lophomma,—*Sim. 1884.*	Ar. Fr., vol. v., p. 533.
		DICYMBIUM, *MENGE. 1867.*	
		Neriene,—*Blackw. 1861.* in part.	Spid. Gt. Bt. Ir., p. 271
		,, ,—*Cambr. 1879-81.* ,,	Spid. Dor. i., p. 109.
		Dicymbium,—*Sim. 1884.*	Ar. Fr., vol. v., p. 541.
		GONATIUM, *MENGE. 1866.*	
		Neriene,—*Blackw. 1861.* in part.	Spid. Gt. Bt. Ir., p. 270.
		,, ,— ,, *1833.* ,,	Lon.Ed.Phil. Mag., 3,iii.
		,, ,—*Cambr. 1879-81.* ,,	Spid. Dor., i., p. 111.
		Gonatium,—*Sim. 1884.*	Ar. Fr., vol. v., p. 546.
		DISMODICUS, *SIM. 1884.*	
		Walckenaera,—*Blackw. 1861.* in part.	Spid. Gt. Bt. Ir., p. 302.
		Walckenaera,—*Cambr. 1879-81.* in part.	Spid. Dor., i., p. 149.
		Dismodicus, *Sim. 1884.*	Ar. Fr., vol. v., p. 563.
		PROSOPONCUS, *SIM. 1884.*	
		Walckenaera,—*Blackw. 1861.* in part.	Spid. Gt. Bt. Iv., p. 309.
		Walckenaera,—*Cambr. 1879-81.* in part.	Spid. Dor., i., p. 152.
		Prosoponcus,—*Sim. 1884.* in pt.	Ar. Fr., vol. v., p. 569.
		SAVIGNIA, *BLACKW., 1833.*	
		Savignia, —*Blackw. 1833.*	L. Ed. Phil. Mag. 3, iii., p. 105.
		Walckenaera,—,, *1861.* in pt.	Spid. Gt. Bt. Ir., p. 317.
		,, ,--*Cambr. 1879-81.* in part.	Spid. Dor., i., p. 170.
		Prosoponcus, *Sim. 1884,* in pt.	Ar. Fr., vol. v., p. 576.
		TYPHOCHRESTUS, *SIM. 1884.*	
		Erigone,—*Cambr. 1872.* in pt.	P.Z.S. Lond. 1872, p. 758.
		Typhocrestus,—*Cambr. 1894.*	Ann. Scot. Nat. Hist., Jan. 1894.
		,, , *Sim. 1884.*	Ar. Fr., vol. v., p. 584.
		GONGYLIDIELLUM, *SIM. 1884.*	
		Neriene,—*Cambr. 1879-81.* in pt.	Spid. Dor., i., p. 120.
		Erigone,— ,, *1879.* ,,	A.M.N.H. 5. iv. p. 210.
		Gongylidiellum, *Sim. 1884.*	Ar. Fr., vol. v., p. 600.

RE "RANDOM RECOLLECTIONS OF WOODLAND, FEN, AND HILL."

In the notice of "Random Recollections of Woodland, Fen, and Hill" (*ante*, p. 152), the reviewer says many kind things of the work, but he points out what he considers two or three errors in matters of fact. The first refers to the young of the blindworm *(Anguis fragilis)*. He says that I have described them as "grey-brown on the back, with whitish bellies," and then goes on to say that all that he has seen "have been quite black below, and usually bright yellow on the back, with a central black band terminating in a spot on the head." Now, what I wrote was:—"They vary in colour, being yellowish or grey-brown," &c.; and as I was describing in most general terms, it seems to me a mere quibble to distinguish between "yellowish" and "bright yellow," the latter term surely being scarcely admissible even for the palest forms of young blindworms, Mr. Bond's creamy-white, mentioned below, being a much better colour term. The reviewer's description appears to be a paraphrase of the well-thumbed description of the blindworm, written years ago by the Rev. J. G. Wood, which, although I have no doubt of its accuracy, I have never been able quite to verify. The black dorsal markings vary indefinitely, so also does the colour of the belly; the former are frequently almost obsolete, the latter varies from a bluish-black to white. On the strength of this supposed colour-difference, my critic suspects that "I have not seen many young ones," a guess sufficiently wide of the mark. From the earlier numbers of the *Young Naturalist* I note the following: Mr. Ullyett, B.Sc. (vol. iii., p. 15), after showing an extensive acquaintance with the blindworm, says:—"I never saw any young ones that were not bright brown," Then Mr. Bond *(Young. Nat.*, vol. ii., p. 262), says that those he has met with have always been a brownish-grey or creamy-white, more or less mottled." Then another correspondent records a June specimen as "greyish-brown with white belly," and so on. These, as the records of field-naturalists, are the more valuable as confirmatory of my own observations, and prove that my descriptions are not so inaccurate after all. It must be admitted that more space should have been given to the description of variations, so that those who only knew one form might not be shocked that I had described another which they had not seen or of which they had not read. The second criticism refers to the sloughing of the snake. My critic lays it down as a law that the snake sloughs "oftener than thrice a year." This may be so; but possibly snakes of varying size, age, and sex do not slough infallibly the same number of times. If they do, we have at last found something fixed and constant in Nature. The reviewer again appears to be generalizing on very slender data. My observations do not support his sweeping assertion. I only notice two records in the back volumes of this magazine, and I find that in one (*Young Nat.*, vol i., p. 203) the number is given as "generally three to four times a year"; this, however, depending on the state of health, whilst a later record gives "two or three times" per year. The third point refers to my statement of the alleged increase of darker "insects" during the last half or three-quarters of a century in manufacturing districts, which fact the reviewer takes leave to doubt. I may mention that my studies in melanism have been connected with Lepidoptera only, and not with "insects" generally. One can understand a difference of opinion existing as to the cause of this increase, but it is rather late in the day to question a fact which all our large collections of Lepidoptera illustrate fully. It would be interesting to a specialist like myself to see the collection of lepidoptera formed by the writer, and to compare the specimens, which I presume he possesses, from the manufacturing districts previous to the use of coal in those districts, with those which have been captured during the last few years. I would recommend him to refer to the following authorities for information on the point:—*Entomologist*, vols. ii. and x.;

Ent. Mon. Mag., vols. xiii., xxiii., xxv.; *Trans. Ent. Soc. London*, 1889, etc.—J. W. TUTT, Westcombe Hill, S.E., 28th June, 1894.

I must respectfully disclaim that wide knowledge of the literature of elementary natural history which Mr. Tutt kindly ascribes to me. Unlike him, I do not possess a copy (well-thumbed or otherwise) of the Rev. J. G. Wood's book; and, as my criticism was based on personal observations, it remains unaffected by the errors of contributors to the *Young Naturalist*. Mr. Tutt has apparently been led astray by a too hasty perusal of my review; if he will again glance at it he will find that it was his statement about the "whitish bellies" of the young blindworms to which I took exception. Against this he quotes the record (of an anonymous correspondent) of one June specimen, "greyish-brown with white belly," and informs us that the "whitish" of his book means "bluish-black to white." If, in the Tuttian vocabulary, "whitish" has so extended a meaning, one is inclined to suspect that "melanism" also may bear a sense which, until it has been defined authoritatively, may be provisionally regarded as ranging over the tints between white and blue-black. I do not claim to be a specialist in Lepidoptera, but am fortunate enough to number amongst my friends some of both the older and younger schools, and have derived much amusement, and I hope some little instruction, from their discussions. Being a very modest mortal, I did not presume to decide on a question about which doctors differ so widely, and therefore contented myself with the expression of a doubt. I fancy, however, that it is easier to prove the theory than the fact, and the tone of Mr. Tutt's concluding remarks strengthens that supposition. With regard to the sloughing of our English snakes, I may add that my statement that they slough "oftener than thrice a year," is based on numerous observations both in the country and in numerous private collections; nor does Mr. Tutt challenge its accuracy. He, however, uses it as a peg on which to hang the statement, that "the reviewer again appears to be generalizing on very slender data." If for "the reviewer" "Mr. Tutt" had been substituted, the sentence would more fairly apply to Mr. Tutt's melanic theories.—THE REVIEWER OF "RANDOM RECOLLECTIONS."

[Have not the author of "Random Recollections," and those of his authorities who refer to the *white bellies* of the young of *Anguis fragilis*, mistaken the dorsal for the ventral surface?—EDITORS.]

REPORTS OF SOCIETIES.

THE SOUTH LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY.

June 14th, 1894, E. Step, Esq., President, in the chair.

Mr. R. Adkin exhibited, on behalf of Mr. Tugwell, a series of vars. of *Spilosoma lubricepeda*, Esp., the product of a cross between var. *radiata* and var. *fasciata*, and read notes; on behalf of Mr. R. A. Adkin, a very variable series of *Cyclostoma elegans*, Müll, taken during the Society's field meeting at Reigate; three specimens of hibernated *Vanessa antiopa*, L., from Montreal, Canada, with pale margins; a series of *Asteroscopus* *nubeculosa*, Esp., bred from Rannoch ova, and some of which had been in pupæ three years; also bred specimens of *Aleucis pictaria*, Curt., from the New Forest.

Mr. Frohawk, on behalf of Mr. Fremlin, a var. of *Apatura iris*, L., from Berlin, intermediate between the type and var. *iole*, Schiff.; on behalf of Mr. South, a dwarf captured specimen of *Euchlöe cardamines*, L., measuring only 1¼in. in expanse, and another specimen with the apical patch of two shades of yellow; also an ovum, *in situ* on a nettle leaf, of *Vanessa c-album*, L., together with larvæ of the same species showing all five stages of growth.

Mr. Manger, a large collection of insects of all orders, captured on the s.s. Kara, by Captain T. Walker, during a voyage to New York and Shanghai and back. It was interesting to note a specimen of *Acherontia atropos*, L., from Shanghai. Some species shown were new. A discussion ensued as to the distribution of species, and the distances from land insects have been noticed.

Mr. Edwards, specimens of *Papilio priamus* and *P. hewitsonii.*

Mr. West (Greenwich), specimens of *Cryptocephalus nitidulus*, Gyll., and *C. coryli*, L., from Box Hill; also two very rosy males of *Smerinthus populi*, L., which had been assembled by a bred female.

Mr. Filer, a long-bred series of *Smerinthus populi*, L. One male was of the female coloration. One specimen had emerged in August of last year, and had the discoidal spot on the primaries much smaller than the rest of the brood, which went their usual period.

Mr. Turner, a series of *Cymatophora ridens*, Fb., from the New Forest, a larva of the same species, and a pupa of *Melita aurinia*, Rott.

Mr. Step, a series of *Helix rufescens*, Penn., *Lymnæa peregra*, Müll., var. *acuminata*, from Epsom, and a side-blown egg of *Helix pomatia*, L., of which many were found at Reigate. A long discussion ensued as to the oviposition of this mollusc. He also exhibited the early stages of growth of *Osmunda regalis*, L., with a series of drawings enlarged to show details, and described the gradual development at length.

The Report of the Field Meeting at Reigate was then read.—Hy. J. Turner, Hon. Report Secretary.

Thursday, June 28th, E. Step, Esq., President, in the chair.

Mr. G. A. Scorer was elected a member.

Mr. C. Fenn exhibited a bred series of *Geometra papilionaria*, L., from a brood of which some were not yet fully fed; a specimen of *Heliothis peltigera*, Schiff., having the blotch in the dark border of hind-wing very large; a very long series of *Selenia lunaria*, Schiff., showing spring, summer, and intermediate forms from one batch of ova; and a Mantis from Australia.

Mr. R. Adkin, specimens taken during the Society's Field Meeting at Reigate, including the specimen of *Pachetra leucophæa*, View., previously reported, and vars. of *Lycæna icarus*, Rott., and *L. bellargus*, Rott.

Mr. Dennis, ova and young larvæ of *Bombyx rubi*, L., from Reigate.

Mr. Manger, a specimen of "British Coral," *Lepralis foliacea*, El. and Sol., taken from a portion of the French Atlantic Cable, about 60 miles from Brest.

Mr. Turner, a long series of *Lycæna bellargus*, Rott., from Box Hill, showing all the ordinary variations, some of the females having a considerable amount of the male coloration.

A discussion took place as to the scarcity and lateness of insects this year, especially with regard to the Geometers.—Hy. J. Turner, Hon. Report Secretary.

ENTOMOLOGICAL SOCIETY OF LONDON.

June 6th, 1894.—Henry John Elwes, Esq., F.L.S., President, in the chair. Dr. K. Jordan, of "The Museum," Tring, and the Hon. Nathaniel C. Rothschild, of Tring Park, Tring, were elected Fellows of the Society. Mr. W. F. H. Blandford exhibited a series of eleven male specimens of *Rhina barbirostris* from British Honduras, of which the largest and smallest examples measure respectively 60 and 17 mm. The difference in bulk, supposing the proportions to be identical, is as 43 to 1. He remarked that this variation of the size is especially common in the *Brenthidæ, Cossonidæ*, and other wood-boring Coleoptera. The President, Dr. Sharp, the Rev. Canon Fowler, Mr. Jacoby, the Hon. Walter Rothschild, Mr. Merrifield, and Mr. Champion took part in the discussion which ensued. Mr. A. J. Chitty exhibited specimens of *Cardiophorus equiseti*, taken near Braunton, on the north coast of Devon, in May, 1891. Mr. Champion and Mr. Blandford made some remarks on the species. Mr. McLachlan exhibited for Mr. J. W. Douglas, male specimens of a Coccid (*Lecanium prunastri*), bred from scales attached to shoots of blackthorn (*Prunus spinosa*), received from Herr Kael Sulç, of Prague. Mr. Douglas, communicated notes on the subject, in which he stated that the species was common on blackthorn in France and Germany, and should be found in Britain. Lord Walsingham exhibited a series of *Cacœcia podana*, Scop., reared from larvæ feeding on *Lapageria* and palms in Messrs Veitch's conservatories in King's Road. Chelsea, including some very dark (melanic) varieties. The Hon. Walter Rothschild stated that he had taken the species on lime. Mr. Hampson and Mr. Tutt also made some remarks on the habits of the species. Mr. C. Fenn exhibited a long series of *Selenia lunaria*, bred from one batch of eggs, and included both the spring and the summer forms; and also two unforced specimens, which emerged in November. He remarked that the variation between the two emergences, viz., spring and summer, is considerable, and also the range of variation *inter se*, especially in the spring form; but it is very remarkable that the summer form has one or two representatives among the specimens of the spring emergence. He said that the parent female was taken at Bexley in May, 1893. Mr. F. Lovell Keays exhibited, on behalf of Mr. Arthur Lovell Keays, a variety of *L. Alexsis* (female), having the marginal ocelli on the hind wings entirely without the usual orange-coloured lunules. The specimen was captured at Caterham, on May 22nd, 1894, and was the first example of the species observed by the captor this season. Mr. Barrett made some remarks on the specimen. Mr. J. H. Durant exhibited a series of *Steganoptycha pygmæana*, Hb., taken at Merton, Norfolk, between the 25th March and the middle of April last. Lord Walsingham made some remarks on the species. Mr. H. Goss read an extract from a report by Mr. J. R. Preece, H.M. Consul at Ispahan, to the Foreign Office, on the subject of damage caused to the wheat crop in the district of Rafsinjan by an insect which was called "Sen" by the natives, and which he described as "like a flying bug, reddish olive in colour, with heavy, broad shoulders." Mr. Goss said he had been asked by Mr. W. H. Preece, C.B., to ascertain, if possible, the name of the species known to the natives as "Sen." Dr. Sharp said that in the absence of a specimen of the insect it was impossible to express an opinion as to the identity of the species. The Rev. Canon Fowler exhibited, for Miss Ormerod, specimens of *Diloboderus abderus*, Sturm, *Eucranium arachnoides*, Brull., and *Megathopa violacea*, Blanch., which she had received from the La Plata district of the Argentine Territories, where they were said to be damaging the grass crops. He also read notes from Miss Ormerod on the subject. Mr. Hampson raised an important point as to what was the legal "date of publication" of Part I. of the Transactions of the Society, 1894. He pointed out that the question of the priority of the names of certain new species described therein would depend upon the date of publication. A long discussion then ensued, in which Dr. Sharp, the Hon. W. Rothschild, Mr. Goss, Mr. McLachlan, Lord Walsingham, Professor Poulton, and Mr. Verrall took part. Professor Franz Klapálek, of Prague, communicated a paper entitled "Descriptions of a new species of *Raphidia*, L., and of three new species of *Tricoptera*, from the Balkan Peninsula, with critical remarks on *Panorpa gibberosa*, McLach." Lord Walsingham, ex-President and V.-P., then took the chair, and a Special General Meeting, convened under Chap. XVIII. of the Bye-laws, was held.—H. Goss and W. W. Fowler, Hon. Secs.

LEPIDOPTERA.

EUPHROSYNE IN SOMERSET.—The earlier portion of the month of May was here fine, but very windy, and amongst others, I noticed on the wing Euphrosyne, Cardui, Cardamines, Fages, &c. The common ladybird, *C. septempunctata*, was very abundant.—W. MACMILLAN, Castle Cary, 18th May.

ARACHNIDA.

NEPHILA MADAGASCARIENSIS.—This interesting spider is a native of Madagascar, and is known amongst the natives as the Halabé. The male does not exceed in length 3 cm., but the females are found having attained the length of 15 cm. According to Camboué, a French missionary, a single female during the breeding season yielded in a period of twenty-seven days about 3,000 inches of fine silken thread, which is of a golden colour, and which is of sufficient strength, according to Maindron, to suspend a cork helmet. Textures woven of these threads are used by the natives for the purpose of fastening flowers on sunshades, &c. The native name signifies Great Spider.

ORNITHOLOGY.

THE GREATER SPOTTED WOODPECKER (PICUS MAJOR) IN CHESHIRE. —A very fine specimen of this bird was in January last shot in Cheshire by Mr. James Casey, Noctorum, Oxton, and sent to me to mount.—W. COX, Liverpool.

THE BEARDED TIT (PARUS BIARMARCUS) IN CHESHIRE.—On August 10th, 1893, I shot a pair of these rare birds in very fine plumage between West Kirby and Hoylake. These were sold to Dr. W. H. Dobie, and are now in the Grosvenor Museum, Chester.—W. COX, 36, Manchester Street, Liverpool.

NOTES.

NORTH LANCASHIRE FLORA.—A reprint of the first two parts of Mr. Lister Petty's "Constituents of the North of Lancashire Flora," 1507 (?), 1893, lies before us, and, estimating the work from these instalments, it should prove of great value to those Botanists interested in the flora of Lancashire. The method of the work is to give a chronological view of the plants; and the author first gives the name of the plant (with one or two exceptions) in the London Catalogue, followed by the name given to the plant in the work in which it is first recorded as growing in Lancashire (if different), followed by the locality. The district embraced is that portion of the "county bounded by the Duddon, the Brathay, Esthwaite Water, west shore of Windermere to the Ferry, and thence across the Lake to near Storrs Hall; along the Lancashire boundary to the Winster, and down it to its mouth; on the shore below Grange-over-Sands, ... up the coast to the Duddon, taking in Walney Island. Furness is the northern half, Cartmell the southern; the two making up North Lonsdale, or Lonsdale North of the Sands." It is to be hoped the compiler will receive sufficient support to encourage him in his task, and that the "compilation" will when complete meet with the appreciation it deservedly merits.

BOOKS, &C., RECEIVED.

"Entomologist's Record." "Irish Naturalist." "Science Gossip." "The Naturalist." "Journal of Conchology."

TO CORRESPONDENTS.

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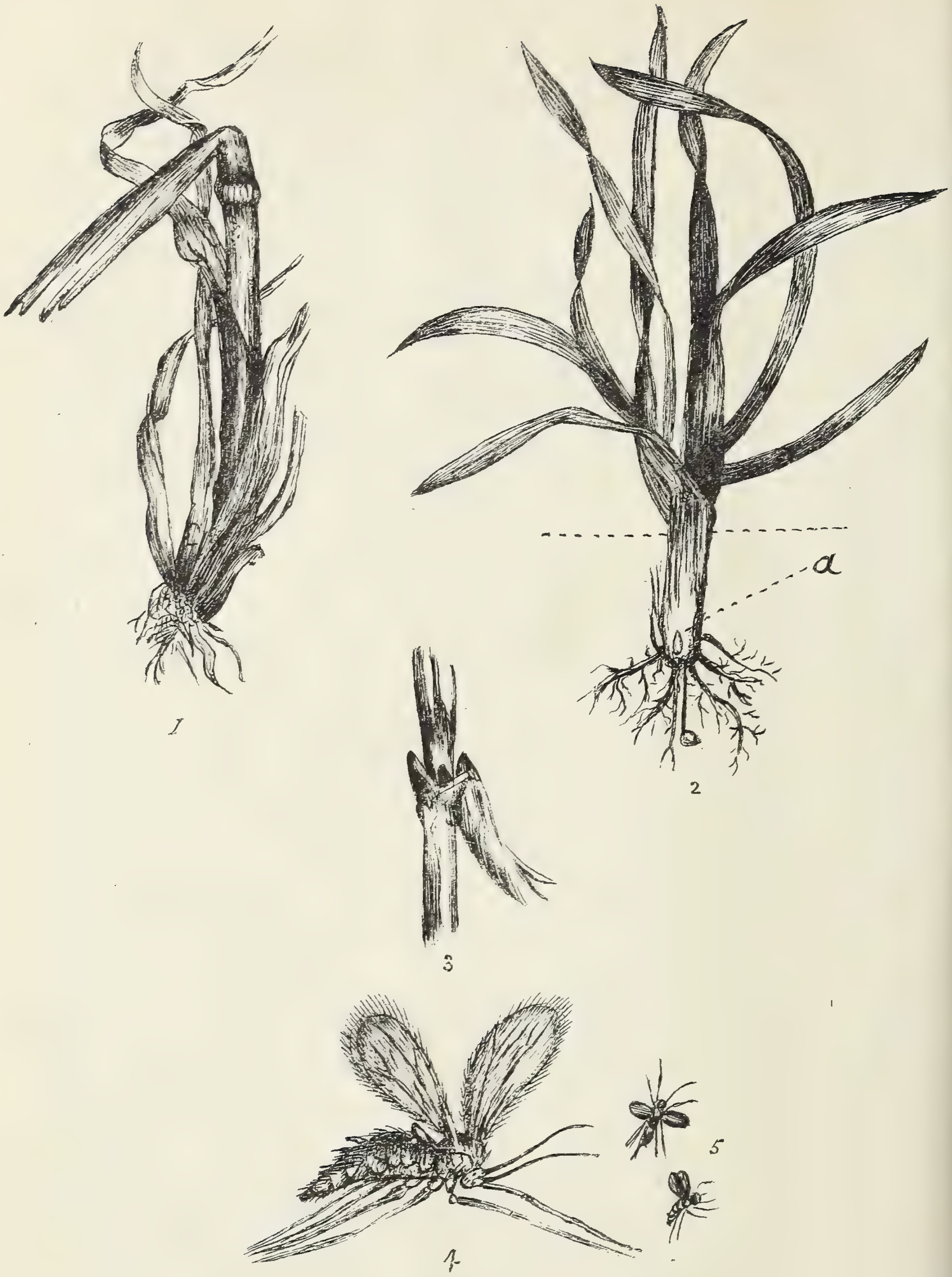
PLATE IX.



The Hessian Fly (Cecidomyia Destructor, Say)

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THE HESSIAN FLY IN SOUTH DEVON.

BY FRED. V. THEOBALD, M.A., F.E.S.,

LECTURER IN ECONOMIC ENTOMOLOGY TO THE SOUTH-EASTERN COLLEGE OF AGRICULTURE, WYE, KENT.

During last summer the Hessian Fly, the *Cecidomyia destructor* of Say, did a considerable amount of damage in South Devon to wheat and barley crops. Few insects can boast of so much careful and widespread investigation as the one in question. Over one hundred articles and pamphlets have been devoted to this fly. It may, therefore, seem unnecessary to swell the number of writings ; such is not the case, however, for in our country little is known of this cereal pest by the agricultural population. Many of the accounts are purely scientific, and by far the greater number hail from our cousins across the Atlantic. Prior to 1886 little seems to have been known in England of this insect. Walker in his work on British Diptera published in 1851, does not mention it, nor do Banks, Westwood, or other economic entomologists, except Curtis, who briefly refers to it in his "Farm

---

EXPLANATION OF PLATE IX.

Fig. 1.—Barley stem, showing Hessian Fly attack ; stem "elbowed down."
Fig. 2.—Plant of young wheat, showing position of Hessian Fly maggot at *a*.
Fig. 3.—Showing "flax seeds," or puparia.
Fig. 4.—The Hessian Fly—*Cecidomyia destructor*—magnified.
Fig. 5.—Natural size.

(From Miss Ormerod's Report.)

Insects."* But the Hessian Fly was present before the great scare of 1886, for, as mentioned in my work on British Flies (Diptera), it was noticed by the founder and editor of the *Entomologist* in 1876, ten years before the scare came. The opinion amongst Dipterists is that the *Cecidomyia destructor* has always been a native of our islands, and not, as was supposed, a recent introduction. The Hessian Fly belongs to an order of insects known as Diptera, or two-winged flies.

If one of these pests that have been doing so much damage in South Devon be examined we shall see that it possesses two wings only, and that these are the front or anterior wings. Behind them we shall see a pair of club-shaped processes or balancers ; these represent the posterior pair of wings of the butterfly or bee. The Hessian Fly, then, is a true dipterous insect. Now, amongst these Diptera we find a family known as the Cecidomyadæ, very small flies whose maggots or larvæ produce deformities or galls upon various kinds of trees and plants. The pest we are dealing with does not, however, form a gall as a rule, nor does its near ally, the Wheat Midge or Red-gum (*Diplosis tritici*), so well-known to farmers ; but last year in Devon I noticed that galled swellings were very prevalent where the maggots were present.

The perfect insect appears at two separate seasons of the year, the first brood hatching in May and June, the second in August and September, and a few even as late as October. The imago, or adult fly, is brown with a pinkish or yellowish-brown abdomen. The antennæ, or horns, are yellowish-brown, and composed of 17 joints in the female, and the same number in the male, but with longer joints ; they are hairy in both sexes. The legs vary from pink to light-red. The wings are covered by a downy pubescense and have very few veins in them, the latter a character of the family to which *destructor* belongs. Both male and female are very small, the former being about 2mm. in length, the latter about 3mm. For a detailed description of this insect the reader is referred to my work on British Flies (Diptera).†

The female of the fly we are now considering generally lays her eggs throughout May and June, upon the leaves of wheat and barley. The eggs are small cylindrical bodies, rounded at each end, and of a pale orange colour at first. The eggs hatch in four or five days. As many as 250 may be laid by a single female ; they are generally placed in batches of eight or ten on separate leaves and plants. The newest leaves of the plant are apparently always chosen for egg deposition, and the ova are invariably placed with the head end downwards, so that the maggot which springs from the egg can at once commence its passage down the

---

* Curtis, "Farm Insects," 1859, p. 258.

† Theobald. "An account of British Flies," 1892. Vol. I., p. 51.

leaf to the stem, where it gradually buries itself. These maggots are short, stout, cylindrical, soft-bodied creatures, transparent at first, but in their later stages assuming an opaque and sometimes reddish appearance. These larvæ, which have 14-jointed bodies, are nearly always found above the second node of the straw, buried in the living tissues. As many as ten were found in a single straw last year in S. Devon, but the usual number is one or two to four. I found the larvæ as late as September on "couch" grass near Teignmouth. The terrible havoc which these grubs do will be described later on. The maggot life may be divided into three stages : (1) The "Feeding Stage," in which rapid growth, resulting from constant feeding, takes place ; it is chiefly now that the damage is done by weakening the stem and causing it to fall or lay, as if weather-beaten. The second stage (2) is known as the "Flax-seed Stage," on account of the resemblance of the larva to a flax-seed. The "flax-seed" is brown, generally a deep chestnut-brown, and marked with longitudinal striæ and also with transverse marks, the same as the segments of the true maggot. This brown "flax-seed" is simply a case or puparium formed of the old maggot skin, within it we find the true maggot. Now, the larva in this second stage has a most remarkable structure beneath it, known as the "Anchor Process," which it uses as a kind of lever to turn itself round in the brown case or puparium. As soon as the maggot has reversed its position it bursts through the puparium and enters its third stage, in which the larva is free for a short time ; it soon casts its skin and becomes a true pupa or chrysalis, with its head upwards, so that the fly can escape readily when hatched. The pupæ are at first white, then pink, and at last brown. The curious "anchor process" is replaced by a horny beak, which forces open a hole for the fly to emerge. The fly escapes on the twelfth or thirteenth day, but may remain in the pupal state for as much as twelve months.

The distribution of this minute fly is very wide. In America it is found from the Atlantic to Kansas, and from the Gulf of Mexico to the St. Lawrence, and each year its distribution increases. It was known in America in 1776, and is supposed to have been taken over there in the corn carried by the Hessian troops.

In Europe it is a widespread pest, and was apparently first detected in Minorca, in 1834. In 1880 it was recorded in Russia, where it does an immense amount of damage. Germany, France, Italy, Austria-Hungary, and Sweden are also some of its favourite abodes. In our own country it is known to have a wide distribution, but is particularly abundant along the East Coast. It, I fancy, has not been recorded before last year in this county, but in some old notes I have I find reference to the "flax-seed" puparia I found in '87 at Sidmouth.

The damage which they commit abroad is often disastrous, whole crops being destroyed. In England the damage seems to vary from one to twelve bushels per acre. There are two distinct modes of attack, luckily one only, the less serious, takes place in our islands. The presence of the attack that we suffer from in England may be known by the stem elbowing down just above the second node, where the maggots are usually to be found. The injury is caused by the white grubs sucking away the juices of the stem, and so weakening it; the stem and ear above become stunted, and then finally bend down as if weather-beaten. The second mode of attack is not recorded so far in England, and I agree with Professor Riley in that it is not likely to appear. This second method of destruction is in young Autumn-sown wheat. The maggots arising from the ova produced by the autumn brood lie in the base of the leaves just above the root, near the surface, and when they assume the "flax-seed" stage they rest between the leaves and stalk. The plant does not "tiller," the leaves become broader and darker, and the central leaflet does not appear. This latter attack is the one the Americans suffer so seriously from. It is absent in England because our Autumn-sown wheat is put in much later than the American. The second brood of flies are dead before our Autumn-sown crop is up. It is strange no autumn brood came from the numerous flax-seeds I gathered in South Devon last year; but some began to hatch during this spring. There is no doubt that the larvæ I found in the "couch" in South Devon in September were the second brood, which do not seem generally to make their appearance in the west. When the second brood does appear it is evidently earlier than in the eastern counties.

Now, as to the methods of preventing and destroying this pest. First I should mention that the Hessian Fly has many natural enemies in the being of small Ichneumon flies. These parasites deposit their eggs in the larvæ and even ova of the Hessian Fly, and eventually destroy their vital powers. They luckily are very abundant in our own country, often more of those Ichneumon parasites will be bred from the flax-seeds than adult Hessian Flies. We must be very cautious, then, in advising any methods of cure, for by destroying the "flax-seeds" we also destroy numbers of these valuable parasites, which keep down an excess of this insect pest. Three of these parasites have been busily at work in South Devon, and must have caused great havoc amongst the Hessian Fly.

There are certain points that are recommended by various economic entomologists in America and elsewhere that are of great importance, if we are not satisfied with Nature's prevention, by parasites. First and most important of these is the destruction of "flax seeds" in siftings or light grain. The little brown puparia are shaken off the straws in threshing, and fall with the "cavings" and light grain. Now, most of the rubbish from the machine is deposited in heaps in the yards and fields, where the flies hatch next year, and so the attack is continued. It is therefore most important that all infested screenings should be burnt and so effectually destroy this pest. The light grain, that also may contain many puparia, should be boiled and given to stock, the puparia being thus killed, which they are not by passing through an animal's alimentary canal. Many "flax-seeds" were found in the early threshings in South Devon, and these with the accompanying Wheat Midge puparia are left, I find, as elsewhere, in heaps to decay.

A large number of "flax-seeds" are also left in the stubble or gratten, either on the straws when cut high or fallen out on to the ground. This I particularly noticed last year in barley fields near Teignmouth. It is also important, then, to destroy these by some inexpensive methods. Burning the infested stubble or ploughing it in deeply will be found to do this. In burning the stubble care should be taken to start the fire all round the edges of the field, so that the fire burns to the centre. In deep ploughing the kind of plough required is one fitted with a skim-coulter, the skimming thrown into the preceding furrow and so buried. Clean farming will also tend to keep down the pest, especially by destroying that pernicious weed, "couch" grass or "twitch," for the Hessian Fly lives also upon this grass as well as upon Timothy Grass. Near Teignmouth, Torquay, and Exmouth I found in the Autumn many puparia upon "couch" grass, as well as in the stubble. The kinds of corn attacked are wheat, barley, and rye. So far there are no records of oats being destroyed. I do not think it has been recorded in rye in South Devon, and I have not myself observed it. The stiff-strawed varieties withstand attack better than the thin, and where the fly has appeared, if possible the former should be chosen. It is also desirable that Autumn-sown wheat should be put in as late as possible, so that the second brood of the fly will have died off before the plant is up. One cannot well account for its great increase last year in South Devon. Although no doubt it has been present there for some years, it would surely have been noticed before had it been in such numbers. I observed it in a large number of places in the southern part of the county, especially where the ground was not "done" well, and I saw in the *Standard* that Mr. Enock also noticed its abundance in the same district. I expect if this fly were searched for, it would be met with in Cornwall and other parts of Devon, in fact in most parts of England. I suppose its numerous and constant records from the East of England are due to the quantity of that "valueless" crop, wheat, grown in that part.

CORRECTION.—On page 137, in line 10 from top, read *eruciformus* for cruciformis, and also for description of woodcut, Fig. 1, same page.

GEOLOGICAL NOTES OF THE SCENERY OF THE KILLARNEY DISTRICT.

BY CHARLES WHITE.

(Read before the Warrington Field Club.)

Killarney has for so long a period been famed for the beauty of its scenery, that it may be taken for certain that what has satisfied many generations must contain abiding elements of charm and fascination. The appreciation of wild natural scenery is not indeed of ancient origin, or dates back further than the middle of the last century. Previously to the poet Gray, the work of nature was not considered perfect until it had been subjected to the hand of man. Mountains were horrid wastes, and trees must be planted and trimmed in particular modes or devices ere they could please; the regularity of a canal was preferred to the windings of a river, and a vista to be enjoyed from a comfortable seat was considered much superior to an open and broad landscape. Gray was the pioneer of Ruskin. In his poems, but more especially in his letters, he showed that nature when unadorned is adorned the most, and he led the way in a growing admiration for such scenery as the Lake District or the hilly parts of Yorkshire afforded. It is somewhat strange that in the pursuit of the new fashion, Irish scenery should at the commencement of this century hold the first place in the estimation of the lovers of the picturesque. It must be remembered that not until the advent of Wordsworth and Southey, as illustrators of the English Lake District, or of Sir Walter Scott as the guide to the beauties of the Scottish Highlands, did any numbers of people visit these two regions with feelings of admiration or content, and there was really far more intercourse with English society and its offshoots who constituted the English garrison in Ireland than with the inhabitants of our own British North Country. A proof of this may be found in the fact that this book—Weld on the Scenery of Killarney—was published in 1808, in this elaborate style, to supply a demand which must have then existed. We may then take for granted that Killarney was famous for its beauty long before the days of railways or cheap trippers. I do not wish at all to examine the sources of this reputation, or to engage in a metaphysical discussion as to the elements of the sublime and beautiful. I want to take you to the landscape, and then point out how its prominent and most characteristic features have been formed. I have always found the study of the geological phenomena of the district most interesting, even though it were entirely unaccompanied by any of those subtle associated ideas of humanity which it is so difficult to divest the mind of. We are so apt to think that everything has been made for us, our use or our enjoyment, that we can hardly contemplate the effects of denuding action going on for millions of years without appropriating them as a tribute to the worth of a modern animal whose years, according to a competent authority, are but three score and ten. Whatever the difficulties of travel may have been in the days of the postchaise or the public coach or the car, it is perfectly easy to reach Killarney now, when a few hours suffice to transport you from Lancashire to Kerry. Whatever condition the traveller may have been in during the journey, whether on the alert of observation or in a semi-comatose indifference to whatever occurred, he must wake up at Mallow. There the line to Cork is left and our train descends sharply to the level of the Blackwater—a river of fame which as we travel westwards we trace backwards to its source. We find ourselves in a hilly country, with plenty of rounded eminences, on the sides or summits of which are comfortable-looking residences, such as, nearer home, we see between Penistone and Barnsley—and the resemblance suggests that you are now in a coal district, although on inquiry you may find that it is an Irish coal district and does not pay for the working. On the surface it is as grey as its English congener, with the same inequalities of contour—the meadows as green, the woods and coppices as bright with wild flowers, and the flashing streams as pleasant to the eye and ear. At length you emerge upon a much wider and more open and level valley, with a long wall of rock, rising every three or four miles to eminences more than 2,000 feet high, bounding the southern view as far either east or west as the eye can travel, and indeed for the matter of that across the whole breadth of Ireland from sea to sea. The base of the valley is composed of gravel heaps coated over with peat, and as it so continues for twenty miles the landscape is somewhat monotonous. The streams that you cross run with sluggish current, and when about half way you reach the watershed, it is not easy of recognition. Approaching Killarney a break of continuity appears in the mountain wall, and through it emerges the river Flisk—the drainage of lands the other side of the range and the rocky sides of the interval exhibit the effects of great pressure in the zig-zag contortions of the strata. As the rail and the river approach nearer to each other one may easily observe that the bed of the latter is cut through the masses of drift that bed the valley.

Proceeding from the railway station at Killarney by the south road towards the mountains, which are about four miles off, we pass through a solemn and deep shaded avenue, from which we emerge to cross the Flisk foaming over its boulder-strewn bed, and then come to a very high and solid wall on the right hand side of the road which effectually screens off the demesnes—or, as we call them, parks—of the resident gentry from the vulgar gaze.

There are breaks in this as in the great mountain wall, and two miles from Killarney you come to the lodge of Mr. Herbert of Muckross, where, under certain conditions (of payment), you may enter in at the gate and get a glimpse of Eden. You are on an eminence, and from your feet sweeps down to a lake a smooth-shaven lawn in stately slope and without abrupt descent. An ample expanse of water, three or four miles in width, extends to the base of the mountains, whose summit ridges rise in peaks or conical projection to a height of 2,500 feet or more. The surface of the water nearest to you is dotted over with small wooded islands, whilst in the middle distance the land curves round in a crescent form on which a ruined castle is prominently distinct. If the day be clear you may see on the western horizon a range of hills that rises above Dingle Bay. On the south the continuity of the mountain wall is changed into the mouth of a wide glen, looking up which you see clusters of mountain forms of varied shape. Now, I would so far trust the instincts of ordinary humanity that I would take a jury from the first fifty wayfarers who came up and were strangers to the locality and put the question point blank—Did you ever see a more beautiful landscape than this? and be confident that the answer would be, Never. It is not easy to define the precise impressions on the senses that lead to the inevitable verdict. Perhaps it may be that the constituent features of the scene are so nicely proportioned or harmonized, that they blend, as do the notes of a musical chord. The gazer stands on an eminence of appropriate height, as may easily be tested by descending half-way down to the water's edge and finding a considerable diminution of the charm. The relative extent of water and the altitude of the mountains, with their regular irregularities of outline, and the sylvan beauty of the foreground, must not be left out of the analysis. Atmosphere, at Killarney, has always been recognized as a potent factor of fascination, and is well described, in a few words, by Lord Macaulay, in the beginning of one of the chapters of his History. Occasionally, though rarely, an aërial effect may be witnessed of transcendent charm. The day may be one of summer haze, or of bright and cloudless sky, and nothing extraordinary may be noted, when quickly a change comes over the scene, and the difference is almost magical. If you thought the view beautiful before, you will be certain that it is superlatively more so now. The hills with their massive folds and undulations, and the woods with ever-varying tints and shapes, are for the time transfigured. The colouring of vegetation and rocks has become more vivid, and you note different shades of green, where before was no predominant hue. Your vision has become more powerful and penetrating. The middle distance has come closer to you, and the hills on the horizon fifteen miles away have taken its place in apparent contiguity. Wordsworth must have had some such transformation in his mind when he wrote ("Laodamia"):—

Of all that is most beauteous imaged there
  In happier beauty, more pellucid streams,
An ample ether, a diviner air,
  And fields invested with purpureal gleams.

The Irish elysium is brief. Perhaps an hour or perhaps two may pass, and then the vision fades into the light of common day. You still see the same objects, but under such changed conditions that you feel as though you had emerged from a dreamy state of only partial consciousness in which your imagination had run away with your power of accurate appreciation of fact.

There are many similar points of vantage to that of the Muckross Lodge, such as for instance Lord Kenmare's new house, or the churchyard of Aghadoe, and, singularly enough, you will look in vain through any of the local collections of photographs for any sun-record of these landscapes. I pass on to inquire how the framework of the scenery has been fashioned into the shape which to us seems beautiful. We have ruins here of such age and remains of such vast pristine greatness that it will take all our powers of conception to form an idea of them. I mentioned purposely the ruined tower on the promontory as a conspicuous object that gave interest to the scene. A ruin of the respectable age of 230 years at once enlists human sympathy. As we gaze on still older remains and trace backwards the life of man in the dim past, by the help that such illustrations as Norman or Grecian or Egyptian ruins afford, we cannot escape a feeling of awe at the huge interval that separates us from our predecessors. Yet what ephemeral erections must their buildings of fort or temple or tomb have been in comparison with the geological structures, the relics of which now confront us. That mountainous wall of rock, by the side of which we have travelled from the east, and which is itself but a remnant of mighty masses that have come into existence and have served their purpose and again have been disintegrated and for ever have disappeared from that form, is but a thing of yesterday compared with those Dingle hills on the western horizon which contain fossils that allocate them without any possibility of doubt to the Silurian system. Our juvenile hills—Mangerton, Torc, the Tomies, and the Reeks, &c., which here rise to the height of 3,400ft., the greatest in Ireland, not much lower than Snowdon, and which claim a probable duration of millions of years—belong to the Old Red Sandstone series. Their place in geological eras is assigned to the Devonian, but there are sceptics in this as in most other things, and Professor Hull would have us believe that they ought to be classified as Upper Silurian. This is a nicety for professional geologists to decide, and to them we will leave it. The Government surveyors estimate the total thickness of this series of strata in Kerry at 10,000ft. There are three or four different appearances which it assumes—one of simple sand rock and a second with a slight admixture of lime, which latter, being more amenable to weathering, takes every opportunity of slipping away, leaving holes on every exposed surface of varying size. A third phase consists of slates of dark hues, and so well displayed on one hillside that the name of Purple Mountain has been assigned to it. A fourth variety is that of a hard solid core, apparently the bottom bed, to which the local name of Glengarif grit is given. All these differences of structure will be met with in an ordinary day's excursion, but it is a very difficult matter to make out the relative position of each stratum in the absence of distinctive fossils.

What everyone, naturalist or not, may and must comprehend is that this collection of mountain forms was once deposited in horizontal layers at the bottom of a lake or sea. Then came probably what is not so certain—a series of growths or depositions of limestone over the whole distance of fifty or more miles that the Old Red extends from north to south. Possibly over these were superadded sundry coal strata, and on the alteration of the relative level of sea and land, and on the emergence from the water and the elevation into lofty central ridges all these succeeding deposits were swept away with the exception of what is left at the base and on the flanks of the mountains after a duration of disintegration that the mind can hardly grasp. Vast ages have passed, in which three-parts of England at least have been formed, during which these Kerry ranges have been exposed to the full force of the ordinary agencies of denudation. That the hard Old Red succumbed and parted with very much of its mass is evident from the gaps in the strata—the islands—the *disjecta membra* of a great formation that are evident on all sides; but if this be the fate of a rock which seems as hard as adamant in its texture, what chance of survival have layers of soft limestone, which admit of solubility in water that is slightly acidulated?

Here may be noted what an important office in nature is served by this quality of the solubility of lime. Without it the animal creation would still be in the jelly state. Lime has a rival in silica, with which some plants can coat themselves, but it is an element so difficult in manipulation that we may say its use would be impossible for the formation of either an endo or exo skeleton. Reflect for a moment on the innumerable instances that a substance which here you see before you a solid rock is capable of furnishing the shells and the eggs and the bones of creation by virtue of its capability of being supplied in a liquid state. Where would be the upright part of man if the little ducts, as the poet says, should cease to feed his bones with lime? Where would be, without this property, those vast masses of limestone strata such as the carboniferous—the chalk—or coral islands, which animal life has been able to construct in all periods of geological history in contradistinction to that other process of plundering existing continents to furnish future lands out of the re-assorted filchings ? Permanence is no part of nature's scheme—indeed, it is what she most abhors—and all matter is in a state of constant flux and reflux of integration and disintegration, however various may be the rate of change. The facility with which secretion leads to accretion is the intimate cause of the want of durability of the product. The same property of its atoms that led up to the building of the limestone rock is the most potent agent in its decay, and the rainfall, which is made acid by absorption of carbonic acid or by vegetable decomposition is for ever taking back the lime to the state in which the primitive corallines discovered and appropriated it.

The solution of strata of salt is a practical fact as to which no inhabitant of Northwich feels any doubt. To me the carboniferous limestone presents very similar phenomena of rapid removal. At Killarney, even my short experience has disclosed scaling of cliffs and falls of large pieces into the water beneath, whilst arched portions of worn rock, which are exposed to the wearing effect of the attraction of gravitation—such as the O'Donoghue's Horse—exhibit a clear annual loss. Old boatmen, whose knowledge of the district extends backwards for fifty years, are ever ready to talk of similar changes.

Hence I see no improbability, but almost a certainty, in the belief that the limestone at one time stretched in a continuous sheet from the Killarney Lakes to the Kenmare River. The space of time is so enormous that every trace of the superincumbent stratum may easily have been washed or dissolved away from the surface of the Old Red, rising slowly to greater elevation than at present, and the only traces that would be left would be at the base of the mountains or in such protected hollows or in such fragmentary detachments as we now see. What is still extant of the Carb. Limestone is principally to be studied on the eastern ends of the middle and lower lakes. These two stretches of water are separated by a promontory which tapers to a point—at Brickeen—and by coasting along this promontory from W. to E. you have displayed an admirable section of the strata which here compose the Carb. Limestone. First you have a yellow sandstone—a narrow band of plunder from the real Old Red ; 2nd, a shaly stratum of cornstone, a mixture of lime and sand ; 3rd, a shaly stratum of alternate layers of lime and sand, and as the more soluble element is in most cases eliminated where exposed to the water, the rock is called the "honeycomb" ; 4th, a compact rock, which in places furnishes building stone of very superior quality, but, unfortunately, the quantity is very limited, and more frequently runs into shales or plates, which when tumbled about in disorderly heaps has suggested the notion of the O'Donoghue's Library ; and 5th, a granular amorphous limestone which always reminded me of ancient chalk. This stratum is much thicker than the rest, and presents chiefly the white cliffs and the caverns at the base.

The caverns that one sees in the limestones of Derbyshire or Yorkshire are the watercourses of streams, which falling on the surface percolate through the strata, dissolving the rock as they go, until the united drainage finds vent in the shape of a goodly river rushing to light in full force. The same process goes on near Killarney, as I shall have occasion to mention. But the caverns by the lake side are made by the lapping of the water against the foot of a cliff, eating it gradually away until the roof seems to have no visible support. It is not all pure destruction, for the water becomes so heavily charged with carbonate of lime that it crystallizes afresh on the floor of the cave, and provides a coating of stalagmite. This process may be studied on dry land, for the lake, having stood at higher levels in former times, has left specimens of rocks with eaten out caverns, now high and dry, above the present surface of the water. They form very picturesque objects, as the grey limestone shows through a vestment of green fern and shrub, and suggest the similarly overgrown Gothic ruin.

The scenery of Killarney owes much of its charm to the profusion of its vegetation, and especially to the majesty and full development of its timber trees. This, no doubt, is in great measure the result of the warm, moist climate and of the freedom from frost which the district enjoys; but this is not all. The trees, such as the oak and the ash and the arbutus, grow very well on the Old Red, but they never attain the beautiful proportions that the same trees exhibit in the Muckross demesne, where the subsoil is lime. The varnish on the leaves of the holly shines out with a beauty that no Lancashire holly is permitted to show. The ivy, too, is of a superlative sort. But just outside the Muckross demesne, where mountain and wood and water combine to present the most beautiful aspect of nature, is a geological phenomenon, one of the most remarkable in its way in Ireland, the product of the glacial era—this is the western edge of a rich bed of drift. It consists of a huge bed of sand freely interspersed with blocks and pieces of Old Red, and is on the average about 250ft. deep. Proceeding westwards it extends from Mill Street to the Muckross demesne (a distance of over 20 miles), and is then conspicuous by its absence to the Gap of Dunloe, but is thence again apparent and dies away on the shores of Dingle Bay.

In the ascent of Mangerton you cross the drift in a distance of about two miles. Patches of deposit of similar material occur at varying heights up the mountain side, the highest being at 2,200ft., where it dams up the water in the Devil's Punch Bowl, and so furnishes a collection reservoir for the Killarney water works, eight miles distant.

(*To be continued.*)

PART II.—Synonymic List of the GENERA of the British ARANEIDEA.

BY THE REV. F. O. PICKARD-CAMBRIDGE, M.A.

(Continued from page 172.)

FAMS.:	SUB. FAMS.	GENERA.	PUBLICATION.
Araneæ Veræ Ecribellatæ.			
	Div. 3. Lophocarenini (*Continued.*)		
Group 2. **Lophocarenini**		ENTELECARA, *SIM. 1884.*	
		Walckenaera,—*Blackw. 1864.* in part.	Spid. Gt. Bt. Ir., p. 298.
		Walckenaera,—*Cambr. 1879-81.* in part.	Spid. Dor., i., p. 159.
		Neriene,—*Cambr. 1879.* in pt.	A.M.N.H. 5, iv., p. 202.
		Entelecara, *Sim. 1884.*	Ar. Fr., vol. v., p. 617.
		AREONCUS, *SIM. 1884.*	
		Walckenaera,—*Blackw. 1864.* in part.	Spid. Gt. Bt. Ir., p. 307
		Walckenaera,—*Cambr. 1879-81.* in part.	Spid. Dor. i., p. 150.
		Erigone,—*Cambr. 1875.* in pt.	P.Z.S., 1875., p. 178.
		Areoncus, *Sim. 1884.*	Ar. Fr., vol. v., p. 631.
		TROXOCHRUS, *SIM. 1884.*	
		Walckenaera,—*Blackw.'64.* in pt.	Spid. Gt. Bt. Ir., p. 301.
		,, ,—*Camb.1879-81.* ,,	Spid. Dor., i., p. 156.
		Troxochrus, *Sim. 1884.*	Ar. Fr., vol. v., p. 645.
		LOPHOCARENUM, *MENGE.1866.*	
		Walckenaera,—*Blackw.'64.* in pt.	Spid. Gt. Bt. Ir., p 315.
		,, ,—*Camb.1879-81.* ,,	Spid. Dor., i., p. 167.
		Lophocarenum, *Sim. 1884.*	Ar. Fr., vol. 5, p. 655.
		PEPONOCRANIUM, *SIM. 1884.*	
		Walckenaera,—*Blackw.'64.* in pt.	Spid. Gt. Bt. Ir., p. 316.
		,, ,—*Camb.1879-81.* ,,	Spid. Dor., i., p. 168.
		Peponocranium, *Sim. 1884.*	Ar. Fr., vol. v., p. 685.
		BARYPHYMA, *SIM. 1884.*	
		Walckenaera,-*Blackw.1864,* in pt.	Spid. Gt. Bt. Ir., p. 306
		,, ,--*Cambr. 1879-81* ,,	Spid. Dor., vol. ii., p. 502.
		Baryphyma, *Sim. 1884.*	Ar. Fr., vol. v., p. 695.
		CNEPHALOCOTES, *SIM. 1884.*	
		Walckenaera,—*Blackw.'64.* in pt.	Spid. Gt. Bt. Ir., p. 297.
		,, ,—*Camb.1879-81.* ,,	Spid. Dor., i., p. 158.
		Cnephalocotes, *Sim. 1884.*	Ar. Fr., vol. v., p. 699.

FAMS.:	SUB. FAMS.	GENERA.	PUBLICATION.
Araneæ Veræ Ecribellatæ.			
	Div. 3.		
	Lophocarenini		
	Group 2.		
	Lophocarenini (*Continued.*)		
		POCADICNEMIS, *SIM. 1884.*	
		Walckenaera,—*Blackw.'64.* in pt.	Spid. Gt. Bt. Ir., p. 312.
		,, ,—*Camb.1879-81.* ,,	Spid. Dor., i., p. 157.
		Pocadicnemis, *Sim. 1884.*	Ar. Fr., vol. v., p. 713.
		METOPOBACTRUS, *SIM. 1884.*	
		Walckenaera,—*Cambr. 1879-81.* in part.	Spid. Dor., ii., p. 448.
		Erigone,—*Cambr.1872.* in part.	P.Z.S., p. 750. 1872.
		Metopobactrus, *Sim. 1884.*	Ar. Fr., vol. v., p. 718.
		STYLOCTETOR, *SIM. 1884.*	
		Neriene,—*Camb. 1879-81.* in pt.	Spid. Dor., i., p. 130.
		Styloctetor, *Sim. 1884.*	Ar. Fr., vol. v. p. 733.
		PLÆSIOCRÆRUS, *SIM. 1884.*	
		Walckenaera,—*Blackw.'64,* in pt.	Spid. Gt. Bt. Ir., p. 295
		,, ,—*Cambr. 1879-81.* ,,	Spid. Dor., i., p. 154.
		Plæsiocræerus, *Sim. 1884.*	Ar. Fr., vol. v., p. 745.
		TAPINOCYBA, *SIM 1884.*	
		Walckenaera,—*Cambr. 1879-81.* in part.	Spid. Dor., i., p. 144.
		Erigone,— ,, *1875,* in pt.	A.M.N.H., 4, xvi., p. 249.
		Tapinocyba, *Sim. 1884.*	Ar. Fr., vol. v.. p. 778.
		CALEDONIA, *CAMBR. 1894.*	
		Caledonia,—*Cambr. 1894.*	Ann. Scot. Nat. Hist, 1894, pl. i., 4, p. 21.
		MINYRIOLUS, *SIM. 1884.*	
		Walckenaera,—*Cambr. 1879-81.*	Spid. Dor.. i., p. 164.
		Minyriolus, *Sim. 1884,*	Ar. Fr., vol. v., p- 787.
		PANAMOMOPS, *SIM. 1884.*	
		Neriene,—*Cambr. 1879-81.* in pt.	Spid. Dor., i., p. 139.
		Walckenarea, ,, ,, ,,	,, ,, i., p. 145.
		Panamomops, *Sim. 1884.*	Ar. Fr., vol. v., p. 792.
	Div. 4.		
	Walckenaerini	WIDERIA, *SIM. 1864.*	
		Neriene,—*Camb. 1879-81.* in pt.	Spid. Dor., i., p. 121.
		Walckenaera, ,, ,, ,,	,, ,, ii., p. 451.
		Wideria, *Sim. 1884.*	Ar. Fr., vol. v., p. 799.

FAMS.: SUB. FAMS.	GENERA.	PUBLICATION.
Araneæ Veræ Ecribellatæ.		
Lophocarenini		
Div. 4.		
Walckenaerini (*Continued.*)		
	WALCKENAERA, *BLACKW. 1833*	
	Walckenaera,—*Blackw. '64.* in pt.	Spid. Gt. Bt. Ir., p. 289.
	,, ,— ,, *'33.* ,,	Lond. & Ed. Phil. Mag. 3. iii., p. 105.
	,, ,—*Cambr. 1879-81.*	Spid. Dor., i., p. 171.
	,, ,—*Sim. 1884.*	Ar. Fr., vol. v., p. 813.
	PROSOPOTHECA, *SIM. 1884.*	
	Walchenarea,—*Blackw. '64.* in pt.	Spid. Gt. Bt. Ir., p. 291.
	,, ,—*Camb. 1879-81.* ,,	Spid. Dor., i., p. 148.
	Neriene,— ,, ,, ,,	,, ,, ii., p. 489.
	Prosopotheca, *Sim, 1884.*	Ar. Fr., vol. v., p. 829.
	TIGELLINUS, *SIM. 1884.*	
	Walckenaera,—*Cambr. 1879-81.* in part.	Spid. Dor., ii., p. 510.
	Tigellinus, *Sim. 1884.*	Ar. Fr., vol. v., p. 838.
	CORNICULARIA, *MENGE, 1868.*	
	Neriene,—*Camb. 1879-81.* in pt.	Spid. Dor., i., p. 113.
	Walckenaera, ,, ,, ,,	,, ,, i., p. 147.
	Cornicularia, *Sim. 1884.*	Ar. Fr., vol. v., p. 843.
Div. 5.		
Cinetini	CERATINELLA, *EMERT, 1882.*	
	Walckenaera,—*Cambr. 1879-81.* in part.	Spid. Dor., i., p. 143.
	Ceratinella,—*Sim. 1884.*	Ar. Fr. vol v., p. 850.
Div. 6.		
Masonini	MASO,—*SIM. 1884.*	
	Neriene,—*Cambr. 1879-81.* in pt.	Spid Dor., i., p. 125.
	Erigone,— ,, ,, ,,	T.L.S., xxvii., p. 450.
	Maso, *Sim. 1884.*	Ar. Fr., vol. v., p. 861.
Section iii.		
Theridiosomatini	THERIDIOSOMA, *CAMBR. 1879.*	
	Theridiosoma,—*Cambr. 1879.*	A.M.N.H., 5, iv., p. 194.
	,, ,—*Sim. 1881*	Ar. Fr. vol v., p. 25.
Mimetidæ.		
	ERO, *C. KOCH, 1837.*	
	Theridion,—*Blckw. 1864.* in part.	Spid. Gt. Bt. Ir. p. 203.
	Ero,—*Cambr. 1879-81.*	Spid. Dor., i., p. 232.
	,, ,—*Sim. 1881.*	Ar. Fr., vol. v., p. 31.

FAMS.:	SUB. FAMS.	GENERA.	PUBLICATION.
Araneæ	Veræ	Ecribellatæ.	
(*Continued.*)			
Argiopidæ			
(Epeiridæ)			
	Tetragnathinæ	PACHYGNATHA,—*SUND.* 1823.	
		Manduculus,—*Blackw.* 1833.	Lon. Ed. Phil. Mag. 3. iii., p. 111.
		Pachygnatha,— ,, 1864.	Spid. Gt. Bt. Ir., p. 318.
		,, ,—*Cambr.* 1879-81.	Spid. Dor. 1, p. 172.
		,, ,—*Sim.* 1881.	Ar. Fr., vol. v., p. 7.
		TETRAGNATHA, *LATR.* 1804.	
		Tetragnatha,—*Blackw.* 1864.	Spid. Gt. Bt. Ir., p. 367.
		,, ,—*Cambr.* 1879-81.	Spid. Dor., ii., p. 243.
		,, ,—*Sim.* 1874.	Ar. Fr., vol. i., p. 153.
	Gastracanthinæ		
		META, *C. KOCH.* 1836.	
		Epeira,—*Blackw.* 1864. in part.	Spid. Gt. Bt. Ir. pp. 349-355.
		Meta,—*Cambr.* 1879-81.	Spid. Dor. ii., p. 238.
		,, ,—*Sim.* 1874.	Ar. Fr., vol. i., p. 145.
		ZILLA, *C. KOCH.* 1834.	
		Epeira,—*Blackw.* 1864. in part.	Spid. Gt. Bt. Ir., pp. 337 and 338.
		Zilla,—*Cambr.* 1879-81.	Spid. Dor. ii., p. 255.
		,, ,—*Sim.* 1874.	Ar. Fr., vol. i., p. 135.
		CERCIDIA, *THOR.* 1870.	
		Epeira,—*Blackw.* 1864. in pt.	Spid. Gt. Bt. Ir., p. 343.
		Cercidia,—*Cambr.* 1879-81.	Spid. Dor., ii., p. 253.
		,, ,—*Sim.* 1874.	Ar. Fr., vol. i., p. 133.
		SINGA, *C. KOCH.* 1836.	
		Epeira,—*Blackw.* 1864. in pt.	Spid. Gt. Bt. Ir., pp. 364-367.
		Singa,—*Cambr.* 1879-81	Spid. Dor., ii., p. 248.
		,, ,—*Sim.* 1874.	Ar. Fr., vol. i., p. 119.
		EPEIRA, *WALCK.* 1805.	
		Epeira,—*Blackw.* 1864. in part.	Spid. Gt. Br. Ir. p. 323.
		,, ,—*Cambr.* 1879-81	Spid. Dor., ii., p. 258.
		,, ,—*Sim.* 1874.	Ar. Fr., vol. i., p. 46.
		CYCLOSA, *MENGE.* 1866.	
		Epeira,—*Blackw.* 1864. in part.	Spid. Gt. Bt. Ir., p. 362.
		Cyrtophora,—*Cambr.* 1874.	T.L.S., xxx., p. 329.
		Cyclosa,— ,, 1879-81.	Spid. Dor., ii., p. 245.
		,, , *Sim.* 1874.	Ar. Fr., vol. i., p. 36.

(*To be continued.*)

A CATALOGUE OF IRISH COLEOPTERA.

BY REV. W. F. JOHNSON, M.A., F.E.S.

No attempt has hitherto been made to catalogue the Coleoptera of Ireland owing to the almost total lack of materials for the purpose.

Lately, however, a considerable amount of interest has been shown in this order, and there are now several active collectors resident in the country. The present, therefore, seemed a suitable time for publishing the accompanying list, not as representing a complete account of the Coleoptera of Ireland, but rather to show what has been done, and to act as a starting point.

In compiling this catalogue I have made use of the lists published by the Belfast Field Naturalists' Club of the collections made by the late A. H. Haliday (Trans. 1883-84, Appendix viii.) and by the late R. Patterson, F.R.S. (Trans. 1884-85, Appendix ix.); also of the list of the Coleoptera of the Dublin District compiled by Professor McNab for the meeting of the British Association in Dublin in 1878. I have also received valuable assistance from Canon Fowler, Rev. J. Bristow, Messrs. J. M. Brown, D. C. Campbell, G. H. Carpenter, H. G. Cuthbert, W. D. Donnan, J. N. Halbert, H. L. Jameson, W. F. de V. Kane, and W. H. Patterson, jun. Several non-entomological friends have greatly assisted me by sending specimens or bags of moss from localities that I could not visit. I have also to thank Canon Fowler, Rev. H. S. Gorham, and Dr. D. Sharp for their kind assistance in determining species with which I was unacquainted. Though I have carefully collated all the information I could obtain, it is quite possible that there are some who have collected in Ireland whose records I have not met with. Should this meet the eye of any such, I hope they will communicate with me and add to the sum of our knowledge of Irish Coleoptera.

I have followed the nomenclature and arrangement of Dr. Sharp and Canon Fowler's catalogue.

As regards localities, as I have given these in full except in the case of common species, where I have merely given the counties in which they have occurred, without adding captor's name. I have used the following abbreviations of the names of collectors:—

J.B.	Rev. J. Bristow, Belfast.
M.B.	J. M. Browne, Dublin.
S.B.	Rev. S. A. Brenan, Cushendun, co. Antrim.
D.C.	D. C. Campbell, Londonderry.
E.C.	E. Roper Curzon.
G.C.	G. H. Carpenter, B. Sc., Science and Art Museum, Dublin.
H.C.	H. Gore Cuthbert, Blackrock, co. Dublin.

Champion	G. C. Champion, F.Z.S., Woking, Surrey.
W.D.	W. D. Donnan, Holywood, co. Down.
A.H.	The late A. H. Haliday.
J.N.H.	J. N. Halbert, Dublin.
H.L.J.	H. Lyster Jameson, Killincoole, co. Louth.
W.F.J.	Rev. W. F. Johnson, Armagh.
W.F.K.	W. F. de Vismes Kane, M.A., F.E.S., Drumreaske House, co. Monaghan.
McN.	Professor McNab's list of 1878.
Dr.P.	The late Dr. Power.
W.H.P.	W. H. Patterson, jun., Holywood, co. Down.
R.P.	The late R. Patterson, F.R.S.
Dr.S.	R. F. Scharff, Ph.D., Science and Art Museum, Dublin.
R.S.	R. Standen.
B.T.	B. Tomlin, Llandaff.
R.T.	The late R. Templeton.
J.W.	J. J. Walker, R.N.
S.M.	Collection in the Science and Art Museum, Dublin.

CICINDELIDÆ.

Cicindela campestris, L.—Near Belfast (J. B.); Churchill, co. Armagh (W. F. J.); Howth (M. B.); Killiney, co. Dublin (McN.); Woodenbridge, co. Wicklow (Dr. S.); Slea Head, co. Kerry, Berehaven, co. Cork (G.C.).

CARABIDÆ.

Cychrus Rostratus, L.—Antrim, Down, Donegal, Armagh, Dublin, Wicklow, Wexford, Cork.

Carabus Catenulatus, Scop.—Down, Donegal, Cavan, Dublin, Wexford, Cork, Kerry.

C. Nemoralis, Müll.—Antrim, Down, Donegal, Armagh, Sligo, Cavan, Louth, Dublin, Wexford, Cork.

C. Glabratus, Payk.—Near Belfast (A. H.); Slieve Donard, co. Down (R. P.); Lough Bray (McN.); Lough Nahangan (H. C.); Luguaquillia (S. M.) all in co. Wicklow; Mountains between Adrigole and Glengariff, co. Cork (G. C.).

C. Violaceus, L.—A rare species in Ireland, Portsalon, co. Donegal (R. S.); Teelin Bay, co. Donegal (J. W.); specimen labelled "Ireland" (S. M.).

C. Clathratus, L.—Mountains near Dungiven, co. Derry (J. B.); Ardara (W. F. J.); Bundoran (S. M.); Teelin Bay, co. Donegal; Westport, co. Mayo; Dinish Island, co. Galway (J. W.); Cranmore, near Belfast (R. T.); Birkie Bog, co. Down (R. P.); Roundstone, co. Galway (B. T.); Kilmacanogue, co. Wicklow (H. C.); Enniskerry (McN.); Slieve Miskish, co. Cork (G. C.).

C. NITENS, L.—Near Belfast (A. H.); mountains near Dungiven, co. Derry (J. B.); Birkie Bog, co. Down (R. P.); very rare, and has not occurred recently.

C. GRANULATUS, L.—Antrim, Donegal, Down, Armagh, Sligo, Cavan, Louth, Longford, Dublin, King's co., Wicklow, Wexford, Waterford, Cork, Kerry; our commonest *Carabus*; varies considerably in colour from dull bronze to brilliant green.

C. MONILIS, F.—Dublin district, taken by the late J. Tardy (McN.).

C. ARVENSIS, F.—Near Belfast (J. B. and A. H.); Ballintoy, co. Antrim, near Newtown Hamilton, co. Armagh (W.F. J.); Rathmullan, co. Donegal (J. W.); Glendoo Mts., co. Dublin; Douce Mt., co. Wicklow (H. C.).

NOTIOPHILUS BIGUTTATUS, F.—Donegal, Antrim, Down, Armagh, Cavan, Louth, Dublin, Wicklow, Wexford, Clare, Cork.

N. SUBSTRIATUS, WAT.—Clandeboye, co. Down (W. H. P.); Kildress, near Cookstown, co. Tyrone, Armagh, Newtown Hamilton, and Loughgilly, co. Armagh (W. F. J.); Cultragh Lough, co. Cavan (J. N. H.); Dursey, co. Cork (G. C.); Dublin Mts. (H. C.).

N. 4-PUNCTATUS, DEJ.—Near Belfast (A. H.); Armagh (W. F. J.).

N. AQUATICUS, L.—Donegal, Antrim, Down, Armagh, Cavan, Louth, Dublin, Wicklow, Wexford, Kerry.

N. PALUSTRIS, DUFT.—Donegal, Antrim, Tyrone, Armagh, Down, Monaghan, Louth, Dublin, Wicklow, Wexford.

LEISTUS SPINIBARBIS, F.—Near Belfast (A. H.).

L. MONTANUS, STEPH.—Croagh Patrick, co. Mayo; Mangerton, co. Kerry (J. W.).

L. FULVIBARBIS, DEJ.—Ardara, co. Donegal; Dunluce, co. Antrim, Armagh (W. F. J.); Cushendun, co. Antrim (S. B.); near Belfast (A. H.); near Holywood, co. Down (W. H. P.); Loughgilly, co. Armagh (H. L. J.); near Dublin (McN.); Dundrum, co. Dublin (S. M.); Beauparc, co. Meath, S. Louth, S. Dublin, Lough Tay, co. Wicklow, Wexford (H. C.).

L. FERRUGINEUS, L.—Near Belfast (A. H.); Dublin district, very local (McN.); Holywood, co. Down (S. M.).

L. RUFESCENS, F.—Portsalon, co. Donegal (R. S.); Portballintrae, co. Antrim (B. T.); Bundoran (S. M.); Clandeboye, co. Down (W. H. P.); Loughgilly, co. Armagh (H. L. J.); Ballintoy Dunluce, co. Antrim; Beleek, co. Donegal, Armagh (W. F. J.); S. Dublin, Wicklow, Wexford (H. C.).

(To be continued.)

ARACHNIDA.

COLLECTING DURING AUGUST.—Collectors may have noticed that spiders are scarcer during July and August than in the preceding months. The fact is that the maturity of spring-time has passed away, while the offspring have not yet become adult, or are even still in the egg stage. Towards the middle of September, however, adults become more frequent. There are nevertheless several distinctly summer species to be taken; for instance, four or five species of *Theridion*, *pallens*, *sisyphium*, *varians*, *denticulatum*, etc. The pale green *Epeira cucurbitina* can also be beaten from foliage or found sitting on railings; the male having beautiful orange-coloured legs. The other species of *Epeira* are *solers*, *agalena*, *adianta*, just becoming adult, and *acalypha*, all found on heathy commons; while *diademata* and *quadrata* will scarcely be fully adult till October. A very fine species has lately turned up in the New Forest, obtained by beating fir trees. It is adult now, and seems to be *Epeira angulata*, Clk. One of the most handsome species of *Theridion*—*formosum*—occurs abundantly in the New Forest, just now, spinning its tangled web on the stems of oak trees amongst the outgrowing twigs. It forms a beautiful little tent-like nest of dead oak leaves, which is slung in the middle of the tangle, and from this the spider drops like a stone to the ground, where it is exceedingly hard to be detected from its exact similarity to a fallen faded bud. The curious three-cornered *Epeira conica* is also frequent in similar localities, sitting on the long white silken streak in the centre of its beautifully symmetrical orb-web. The great grey and black speckled *Philodromus margaritatus* can also be now beaten from oak trees, where it lurks amongst the lichen and cannot be distinguished easily therefrom. Of the *Salticidæ*, or jumpers, *Marptusa* (*Marpessa*) *muscosa* can now be found on grey lichen-covered posts and palings in some localities, while in the same situations *Epiblemum cingulatum*, and on walls the much commoner *E. scenicum*, are to be taken. The *Lycosidæ* are mostly gone by for the present, and besides several species of *Erigone* and *Gongylidium*, on railings, in dull warm mornings, and a few *Linyphias*, there is not any great abundance of anything just now in this particular group. *Argyroneta aquatica* is fully adult, and ought to be found in suitable ditches almost anywhere throughout the country.—F. O. P.-C., July 27th, 1894.

VERTEBRATA.

COLORATION OF ANGUIS FRAGILIS.—I have examined carefully both young and old specimens of *Anguis fragilis* during the last few days, and I find that the colouring is as follows:—Dorsal area, rich cream-brown of various shades; lateral area, darker mottled brown with a fine, still darker, longitudinal line; ventral area, sooty-black. One fine variety was pale ashen-white all over; same on the ventral area, which was suffused with faint sooty-black. In some specimens the black presents a bluer tinge than in others; but in all the cases which have come under my notice, the contrast between the black suffusion of the ventral area with the rich creamy-brown of the dorsal surface was very marked.—F. O. P. C., Swanage, July 27th, 1894.

REPORTS OF SOCIETIES.

THE SOUTH LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY.

July 12th, E. Step, Esq., President, in the chair.

Mr. R. Adkin exhibited a bred series of *Dianthœcia nana*, Rott., from Unst, all very dark and some unicolorous, and a yellow-banded var. of *Sesia myopiformis*, Bork., from Mr. Wellman's collection.

Mr. Oldham, series of *Rumia cratægata*, D.L., including one with a very well-developed waved line on all four wings, of *Noctua triangulum*, Hufn., and of *Dasychira pudibunda*, L., all bred this year from Epping Forest; also insects taken at Wisley on July 7th.

Mr. Dennis, varieties of *Epinephele janira*, L., including a fine xanthic specimen.

Mr. Auld, a long bred series of *Phorodesma smaragdaria*, Fb., from Essex, one specimen having only the discoidal spots present.

Mr. C. A. Briggs, a specimen of the rare Lacewing Fly, *Nothochrysa capitata*, taken at Wisley.

Mr. Edwards, two specimens of *Ornithoptera crœsus*, from Batchian, *Papilio gyas*, from India, and *P electra*.

Mr. Perks, the egg of a Coccinella deposited on the point of a thorn.

Mr. Turner, series of *Lycæna minima*, from Galway, showing gradual diminution of spots on the underside; a brown-suffused var. of *L. astrache*, Bgstr., from Reigate, and an asymmetrical var. of *Smerinthus tiliæ*, L.

Mr. Winkley, recently-hatched young of *Helix pomatia*, L., concerning which a long discussion ensued; also fossil wood from Shanklin and two fossil oysters, one from the same place and the other from the centre of Australia.

Mr. Hall, examples of *Drosera rotundifolia*, L., and *D. intermedia*, Hayne, from Wisley, and read notes. A long discussion ensued.

Mr. Step, specimens of *Spiræa filipendula*, L., and *Carduus nutans*, L., from the Downs, and described their characteristics.

Mr. Rice, two "cock's nests" of the Wren, one from Wisley, and an ordinary nest for comparison; also the eggs of a Bullfinch taken during the Field Meeting.

Mr. Turner read the Report of the Field Meeting on July 7th, at Wisley; and Mr. Carrington made some remarks upon the scarcity of Lepidoptera in that district, and noted the abundance of Neuroptera.

Thursday, July 26th, E. Step, Esq., President, in the chair.

Mr. Frohawk exhibited a bred series of *Melitæa cinxia*, L., set to show the variation on the underside. One specimen had large oblong blotches in the light median band.

Mr. Hall, a very variable series of *Melanippe hastata*, L., from Sheffield, Scotland, and the Hebrides; some specimens showing the median white band almost obliterated.

Mr. Carpenter, a bleached var. of *Epinephele janira*, L., from the New Forest, being the only insect captured worth recording during a fortnight's hard work. He stated sugar was an absolute failure.

Mr. Robson, a series of *Macroglossa bombyliformis*, Och., taken on May 15th, in the New Forest. A discussion ensued as to the presence of scales on the wings at emergence.

Mr. R. Adkin, a series of *Coccyx strobilella*, L., together with the spruce cones from which they had been reared, and read notes on the economy of the species. A discussion ensued.

Mr. Auld, a bred series of *Calymnia affinis*, L., from Chattenden; and also a series of *Ephippiphora fœnella*, L., bred from mugwort roots, which were shown with pupa cases *in situ*.

Mr. Moore, a number of fossil shark's teeth, taken out of a cargo of guano, from Bull River, S. America.

Mr. Harrison, photographic views of Boldermere, taken during the Society's Field Meeting at Wisley, and which he presented to the Society.

Mr. Perks, a pale specimen of the Wood Betony (*Stachys betonica*, Benth.); and several microscopical fungi.

Mr. Adkin read a communication from Mr. South, stating that the dipterous larvæ exhibited some months ago in the stems of *Arundo phragmites*, had been found to be *Lipara lucens* larvæ.

Several members remarked upon the abundance of *Acidalia virgularia*, Hb., (incanaria, Hb.); and the scarcity of *Spilosoma menthastri*, Esp., *S. lubricepeda*, Esp., and *Euplexia lucipara*, L., while last year just the reverse occurred.

Mr. Frohawk said that Blackbirds and Thrushes were this year still in full song, and remarked how unusually late it was.

Mr. Step reported that a rare fungus, *Peziza hæmastigma*, had made its appearance upon a ceiling in his house.—HY. J. TURNER (Hon. Report Secretary).

ENTOMOLOGICAL GATHERING.

Saturday, the 28th July, 1894, may be looked upon as a red-letter day in the annals of local Entomology, for on that date the genial President of the Lancashire and Cheshire Entomological Society (Mr. S. J. Capper, F.E.S., F.L.S.) entertained at his house, Huyton Park, near Liverpool, some 30 to 40 of the local Entomologists, as well as many of the leading Entomologists from other parts of the country. The guests began to arrive about 4 p.m., when many friends had the pleasure of meeting their comrades (in Ento.) after the lapse of years. These réunions are always very enjoyable, and matters entomological were pleasantly and advantageously discussed. During the evening an opportunity was given of seeing Mr. Capper's superb collection of British Lepidoptera, which contains many rare and beautiful varieties. The beauty of the collection is not a little enhanced by the great care bestowed upon the arrangement of the various groups, and also from the fact that all specimens are perfect and in splendid condition. This valuable collection is always on view to callers, Mr. Capper taking special interest in helping forward those who are young in the science of Entomology. Many of the grand varieties in this collection are being figured in the work now being published under the able editorship of Mr. Barrett.

Amongst the many guests and personal friends were—Messrs. Barrett, F.E.S., Bignell, F.E.S., H. H. Corbett, M.R.C.S., H. Capper, Rev. A. W. Carter, Messrs. Crabtree, Collins, J. W. Ellis, L.R.C.P., F.E.S., Gregson, Green, L. Greening, F.L.S., M.R.I.A., R. Newstead, F.E.S., Pierce, F.E.S., W. E. Sharp, F.E.S., C. F. Johnson (Stockport),

W. H. H. Walker, Wilding, Watson, Webster, W. Johnson (Wigan), and I. C. Thompson, F.L.S., F.R.M.S. Such a gathering of the old and the new school of Entomologists introduced many interesting subjects for discussion, species making and melanism being very much to the front. Rēunions such as this one help forward the cause of Natural History, giving as they do opportunities of personally meeting those with whom one has corresponded, and thus cementing the good fellowship by a shake of the hand.

Mr. Capper is to be congratulated upon the success of the meeting, as also upon the admirable and hospitable manner in which he entertained his friends, and long may his kindly face and hospitable manner be spared to continue the good work he is doing amongst the local Entomologists.

Letters of regret were received from Messrs. Briggs, Porritt, Robson, Threlfall, Hodgkinson, Mosley, Chappell, and others.

CARLISLE ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY.

An ordinary meeting of this society was held on Thursday night, the 5th ult., at Tullie House, the President (Rev. H. A. Macpherson) in the chair. There was a good show of exhibits. Specimens of the little gull and two young gold-crested wrens were exhibited by the President. Other members showed a number of Lepidoptera, among which were *Eupithecia rectangulata*, *Emmelesia decolorata*, *Acronycta leporina*, *Dianthœcia cucubali*, and *Hadena rectilinea*. The last-named is a new insect to this district, and the first specimen taken was by Mr. F. H. Day, at sugar in a wood near Carlisle, about a fortnight ago. It has, however, been since taken by Mr. J. Wilkinson at another locality. *E. rectangulata* is said to be common here, but only one specimen has been taken, and that by Mr. Wilkinson. Mr. Wilkinson also found some unknown *tortrix* larvæ feeding on laurel in the garden in Tullie House.—John Buckle.

NOTES.

On Type Insects.—Is the description the sole real authority of the type? If so, what becomes of *Libellua œnea*? Linnæus' description of it will, at least, apply to three species, viz., *Cordulia œnea*, *C. metallica*, *and C. arctica*. Any such fixed rule as the above would land Science in a difficulty. Linnæus again named his three species of the genus Bombylius—major, medius, and minor. Strange to say, medius is almost invariably larger than major. Verrall calls medius—discolor, Mik. Has he examined the type in the Linnæan collection, or has Mik done so? Now that we are on the subject of types, I may as well inform Mr. Tutt that the type specimens of *Ascosmetia Morrisii*, Dale, are in my collection, and that they are white varieties of *Arcuosa* and not *Bondii*, as he has been good enough to suppose. One reason why Gueneé and other writers of repute rejected the names of Hæfuagel, was because his descriptions did not well conform to the appearance and character of the species they were supposed to represent. This is, I suppose, what Mr. Tutt would wish me to discuss with him. At all events, I will have nothing to do with the false science—Spiritualism. —C. W. Dale.

ON AQUATIC DIPTERA.—Mr. Swainson in his article on "Some Curious Aquatic Larvæ," mentions that Mr. Ridley found *Thalassomyia Frauenfeldi* in a cave, in the Isle of Wight, in 1884. If Mr. Swainson would only read the *Entomologists' Monthly Magazine*, vol. xx. p. 214, he will find that I took both sexes of it on Nov. 4th, 1868, in a cave, under the cliff at Freshwater, Isle of Wight. Probably my account of it led Mr. Ridley to find it there. In the same article I remarked another species of the same family, *Clunio maritimus*, Hal., as skimming over pools of water left by the receding tide, at Hastings. I again met with *T. Frauenfeldi* in the Isle of Man, sitting on rocks, in October, 1891. This may be of interest, as Mr. Swainson found his *Campontia* there. Probably both *Thalassomyia* and *Clunio* are pretty generally distributed round our coast, and only want looking for. There are at least two others of the same family which occur on seaweeds. There are papers by Mr. Haliday on marine insects, in the *Natural History Review*, and he also gives a list in it of British Diptera, the earlier stages of which are more or less perfectly known. There are so many books on Natural History at the present time that people may well be forgiven for overlooking the proceedings of the predecessors. —C. W. DALE, Glanville Wootton, Jan. 20th.

BOOKS, &C., RECEIVED.

"*Science Gossip.*" "*Entomologist's Record.*" "*The Naturalist.*" "*Le Naturaliste Canadien.*" "*American Monthly Microscopical Journal.*" "*Proceedings of the South London Entomological and Natural History Society*, 1892-3." "*Transactions of Guernsey Society of Natural Science.*" "*Lancashire and Cheshire Entomological Society*, *Session* 1893."

EXCHANGE.

WANTED, Busk's Catalogue, and pamphlets on Polyzoa.– J SMITH, 121, Bewsey Terrace, Warrington.

WANTED, living specimens of any of the Orb-weaving Spiders (Epeirides and Ulobonides). for which cash or good exchange will be given.—JOHN RHODES, Technical School, Accrington.

DUPLICATE COLEOPTERA.—Dorytomus vorax, Pt. oblongo-punctatus, Deporæiis betulæ, C. campestris, Rhizophagus bipustulatus, Pogonus luridipennis (2), S. cylindricum, Melanotus rufipes, Cleonus sulcirostris. Melandrya caraboides, &c. *Desiderata*, numerous.—F. W. LAMBERT, 70, St Giles, Oxford.

DUPLICATES.—Adippi (fine and long series), Cardamines, Alveolus, Fages, Lucina. Tithonus, Geryon, Edusa (males). *Desiderata.*—Blandina, Zonaria, and many others, (Fine and well set only.)—F. W. LAMBERT, 70, St. Giles, Oxford.

COLEOPTERA.—*Duplicates*: Phinus germanus, Cænopsis waltoni, Amalus scortillum, Phytobius 4-tuberculatus, Tachys bistriatus, Anthonomus rosinæ, Ochina hederæ, Dryophilus pusillus, Platytassus echinatus, Apion vernale, Scymnus mulsanta, S. hæmorrhoidalis, S. frontalis, Telephorus hæmorrhoidalis, Anthicus instabilis, &c. *Desiderata*: Offers of scarce and local Coleoptera.—A. FORD, Glen Mount, Braybrooke Road, Hastings.

PRESERVED LARVÆ.—*Duplicates*: Quercus, Urticæ, Jaccobæ, Caja, Bucephala, Lanestris, Carpini, Cœruleocephala Cossus. *Desiderata*: Any of the clearwings Sponsa, Nupta, Promissa, Villica, Dominula, B. rubi, Plantaginis, Batis, and many others.—S. B. CHANDLEY, Latchford, Warrington.

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Evolution of Sense Organs. Hy. Langdale, M.D. Plate.
The Life History of a Sponge. R. Hanitsch, Ph.D. Plates.
Some Curious Aquatic Larvæ. Geo. Swainson, F.L.S. Plates.
Sexual Distinction of Insects. C. W. Dale, F.E.S.
An Entomological Trip to the Canary Islands. Morel-Deville.
Extracts from "Sylva Sylvarum." A. E. Hall.
Sugaring Notes.
Habits of Larva and Parasites on Orthosia Upsilon. J. Collins.
Bibliography of British Spiders. Rev. F. O. Pickard-Cambridge, M.A.
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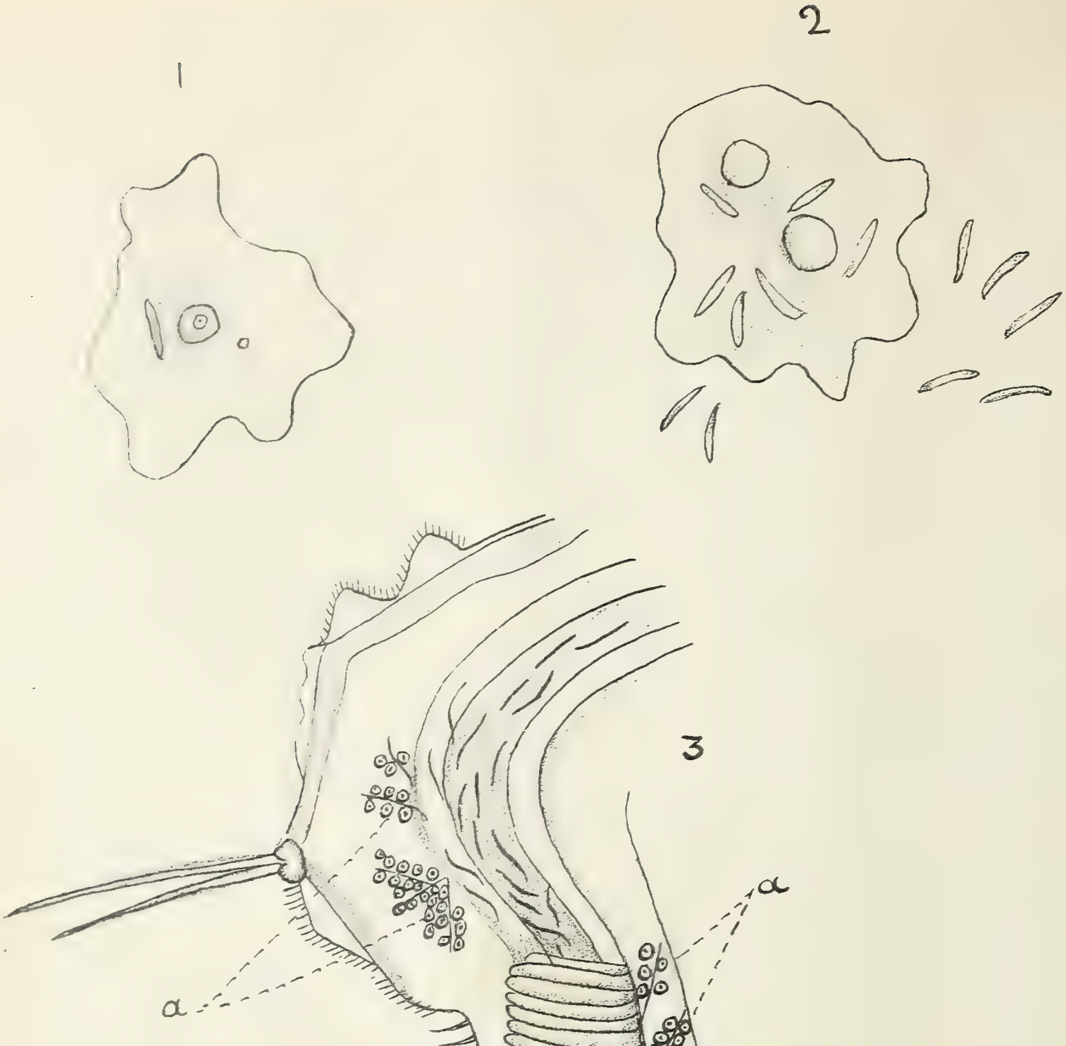
Synonymic List of British Spiders. Rev. F. O. Pickard-Cambridge, M.A.
Water. E. Bowden, M.R.C.S.
Evolution of the Vegetable Stem. A. J. Gillanders.
Crag Polyzoa. J. Smith, F.L.S.
The Greenfinch. Arthur Jackson.
Notes on Pond Life. S. Parsonage. Plates.
Evolution of the Spider. Linnæus Greening, F.L.S., M.R.I.A. 19 plates.
Bird Notes. Philornis.
Byways of Botany. J. P. Soutter.
Gossiping Notes on Coleoptera. By G. A. Lewcock, F.E.S.
Angling Notes. A Day on the River Gowy. W. H. J. Jenkins, Esq.
Microscopical Notes from Note Book.

BRITISH MUSEUM NATURAL HISTORY.

PLATE X.



Phagocytes.

THE
BRITISH NATURALIST.

NEW SERIES.

PHAGOCYTES.

BY A. H. YOUNG, M.B., F.R.C.S.
PROFESSOR OF ANATOMY IN OWENS COLLEGE, MANCHESTER.

That the struggle for existence between the simple and primitive forms of life is as keen as that between more highly developed and complex organisms is well known to all naturalists; but whilst one may look with comparative indifference on a warfare between the higher forms of life which at the most ends in the destruction of the individuals actively engaged, and which is, in a sense, carried on outside and independent of ourselves, the case is very different when the battle of the lower and simpler forms of life is being fought out, since not unfrequently we have to provide in our own persons both the battle ground and some of the combatants—and the result of the conflict may be fatal to us.

It is beyond question that many diseases are due to the introduction from without of viable micro-organisms—germs—but it is not easy to explain satisfactorily, how it is that the access of germs capable of producing definite disease does not always do so. It is a matter of common knowledge when a number of individuals are exposed to infective diseases, that some fall victims whilst others escape entirely. To put this more definitely, it can be

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EXPLANATION OF PLATE X.

Fig. 1.—Amœba with nucleus and food particle.
Fig. 2.—Amœba living amongst bacilli, some of which it has taken up.
Fig. 3.—Hind part of a Daphnia infected with Monospora. *a*, Spores surrounded with Phagocytes.
Fig. 4.—Spores of Monospora, showing changes produced by Phagocytes.

(Figs. 2, 3, and 4 are slightly altered from Metchnikoff.)

clearly shown that the introduction of tubercle bacilli into a guinea-pig is rapidly followed by general tuberculosis, and usually by death, whilst it is found that the cat and dog are much less susceptible. Still more remarkable is the susceptibility of the common house rat to anthrax, the bacillus of which is so stoutly resisted by the white rat. Clearly some individuals, and even species, seem to have the power of resisting disease germs—they enjoy an immunity, or, in other words, are not susceptible. The fact is important, and it is not surprising that many theories should have been advanced to explain it. Not the least fascinating of these theories is that which regards infection and resistance in disease as a struggle between an attacking force of pathogenic, *i.e.* disease-producing, organisms, and a defending army of cell elements. This theory has long been held by various observers, but it is to Professor Metchnikoft, a biologist, that we are indebted both for a clear statement of the grounds upon which it is based and for observations which have made the acceptance of the theory possible.

Metchnikoff shows that even in unicellular organisms, as the amœba, a microbe in order to infect the Protozoon has to combat the power possessed by the protoplasm of the latter of ejecting or digesting the parasite. This is further and more completely illustrated by the phenomena observable in Infusorians. These may be invaded by lower organisms, but it is only when they reach the nucleus or nucleolus, that they have any chance of living and conquering. Hafkine introduced Paramœcia into capillary tubes containing spores of a rod-like parasite, but although these spores were swallowed and engulfed yet they could not combat the digestive force of the protoplasm, and they were soon ejected like a foreign body. If, however, the spores reached the nucleus or nucleolus, neither of which has any digestive capacity, then they flourished and germinated to the disadvantage of the Infusorium, which indeed might die. On the other hand, the infested Infusorium might survive and undergo division; during division some of the parasites escape from the nucleus into the surrounding protoplasm, and coming under its influence are ejected, and this being repeated again and again, all the parasites may be expelled, the Paramœcium recovering completely.

Thus, it seems quite possible that this digestive and expulsive power of protoplasm, is the defensive agent which protects the organism against invasion. In more complex multicellular organisms cells manifesting these powers are called Phagocytes. It is obvious that defending organisms must be capable of amœboid movement. They must be able to approach foreign bodies—bacteria, &c.—in order to swallow and digest them, or in some cases, it may be, to retreat from antagonistic germs. The attraction which draws a phagocyte towards a body suitable for its action is known as *positive chemiotaxis*, whilst the repelling force which causes a leucocyte to retire from an enemy is named *negative chemiotaxis*.

Phagocytes, then, may be defined as all elements which manifest chemiotactic properties and which possess the power of englobing and digesting substances and either absorbing them entirely or rejecting the residue.

In those animals which possess formed elements in the blood, some of the leucocytes—though not all of them—are phagocytic, but endothebal cells and mobile connective tissue cells also supply phagocytes.

The phenomena of Phagocytosis in themselves are profoundly interesting to the naturalist, and in view of the theory of Metchnikoff—that in them we have the explanation of the power of resistance to disease germs which constitutes immunity—they are no less so to the pathologist. The theory is not free from objections, but it is not my object in this brief sketch to discuss the various objections to it, or the alternative theories which have been advanced, so much as to draw attention to the subject of phagocytes and their influences.

Nothing could be more suggestive or more illustrative than the record of Metchnikoft's observations upon Crustaceans, many of which are subject to infectious diseases. The most interesting instance is furnished by the Daphniæ, which not unfrequently are invaded by a yeast-like fungus multiplying by budding (*monospora bicuspidata*) which may be found as long spores enclosed in a capsule in the body cavity of the Crustacean in large numbers (Plate X., Fig. 3).

The Daphniæ devour the spores, and are thus infected through their alimentary canal. Losing its capsule, a spore punctures the wall of the canal and reaches the body cavity. It is then immediately attacked by leucocytic phagocytes carried by the blood stream, a group of which collects round the spore. Under their influence the spore is destroyed and breaks up into a mass of granules (Plate X., Fig. 4), having no resemblance to the original spore, and that this is due to phagocytic influence is proved by the fact that when only part of the spore is protruded into the body cavity, the rest, remaining in the wall and so being protected, remains normal.

The destruction of the spores may be complete; on the other hand the spores may prove too strong or too numerous, and some begin to germinate and give rise to budding conidia. They then usually gain the victory, and the leucocytes disappear. As Metchnikoff concludes, "There can be no doubt that the whole history of this disease of the Daphniæ may be summed up as a struggle between two living organisms, the parasitic cells and the phagocytes."

Equally suggestive is the battle which takes place in Erysipelas—an inflammation of lymphatic capillaries due to the presence of streptococci. Of this, MacFarland, in an interesting paper on "Susceptibility and Immunity,"* gives the following graphic account: "At the edge of an erysipelatous patch a most active warfare is being waged between the streptococci and the cells. Near the centre of the patch there are many free streptococci and also a great many streptococci enclosed in cells (leucocytes), which are, for the most part dead. Further out we find hosts of active living cells engaged in eating up the enemies as fast as they can. The phagocytologists tell us that at the centre the bacteria are fortified, actively growing and virulent. In the next zone, the leucocytes which have feasted upon the bacteria are poisoned by them. Outside, the cells which are more powerful and are constantly being reinforced are waging successful warfare against the streptococci. In this manner the battle continues—the patch spreading when the phagocytes have to yield—or, on the other hand, the disease being arrested when the phagocytes are victorious.

In injuries again, say in the case of an open wound to which germs may easily gain access, at the very outset these germs meet with phagocytes; if these are sufficiently numerous and powerful they defeat the microbes, and the wound heals up quietly and readily—but if the germs flourish and get beyond the line of defence, they enter spaces between connective tissue elements and so reach lymph channels along which they travel to the nearest lymphatic glands. Here a second line of defence is encountered, and since the phagocytes in lymphatic glands are numerous and active the conflict is a severe one—the accumulation of dying combatants constituting an abscess—whilst in the surrounding region living phagocytes are resisting further invasion; failing in this, the invading germs make further progress and passing on enter the blood stream. The general effects on the invaded individual become more pronounced, as is evidenced by "fever." There is, in short, a condition of blood-poisoning, the febrile symptoms being a further effect of the conflict between leucocytic phagocytes and the aggressive micro-organisms.

Under more normal and healthy conditions Phagocytosis will probably be studied with greater interest by the naturalist in connection with the metamorphoses of Batrachians, the absorption of structures which have become functionally useless being apparently due to the action of phagocytes.

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* "International Medical Journal," Jan., 1894.

On this point and, indeed, on all others connected with phagocytes and phagocytosis, I would refer such as are desirous of studying the subject further to the remarkable lectures on the "Comparative Pathology of Inflammation," delivered by Professor Metchnikoff at the Pasteur Institute in 1891 and published in England in 1893.* In these lectures it is gratifying to find the biologist acknowledging the importance of morbid processes, particularly of the struggle between the organism and its aggressors in the "consecutive study of the course of natural selection," and admitting that whilst "medical science may learn much from biology, of which it forms but a part, it may at the same time give something in return."

A CATALOGUE OF IRISH COLEOPTERA.

BY REV. W. F. JOHNSON, M.A., F.E.S.

(Continued from page 197.)

NEBRIA COMPLANATA, L.—Arklow, co. Wicklow (a dead specimen found by Mr. Furlong, afterwards found in abundance by Mr. Percival Wright); Courtown, co. Wexford (H. C. and W. F. K.); Waterford (S. M.).

N. BREVICOLLIS, F.—Donegal, Antrim, Down, Armagh, Louth, Dublin, Wicklow, Wexford, Cork.

N. GYLLENHALI, SCH.—Ardara, co. Donegal; Armagh, Clay Lake Keady, co. Armagh (W. F. J.); Dublin Mountains, Glendalough, co. Wicklow (H. C.); Callay, co. Wicklow (S.M.).

PELOPHILA BOREALIS, PAYK.—Lough Neagh (A. H.); Shane's Castle, co. Antrim (W. D.); Markree Castle, co. Sligo (W. F. K.); banks of River Erne above Ballyshannon, co. Donegal; Maghery and Derryadd, on shore of Lough Neagh; Lowry's Lough Armagh, Clay Lake Keady, and Loughgilly, co. Armagh (W. F. J.); Killarney (Wollaston).

BLETHISA MULTIPUNCTATA, L.—Near Belfast (A. H.); Templehouse Lake, Ballymote, co. Sligo (S. M.); Coolmore, co. Donegal; Lowry's Lough, Armagh (W. F. J.).

ELAPHRUS RIPARIUS, L.—Ardara, Coolmore, and banks of River Erne, above Ballyshannon, co. Donegal; near Scotstown, co. Monaghan; Lowry's Lough and Loughgall, co. Armagh (W. F. J.); near Belfast (A. H.); Ballymote, co. Sligo (S. M.); Dublin district (McN.); S. Dublin (H. C.).

E. CUPREUS, DUFT.—Portsalon, co. Donegal (R. S.); near Belfast

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* Kegan Paul, Trench, Trübner & Co., London.

(A. H.); Dundalk, co. Louth; Tallaght, co. Dublin (J. N. H.); Lucan, co. Dublin (Dr. S.); Glen of the Downs, co. Wicklow, Killarney (S. M.); Ardara, Coolmore, River Erne above Ballyshannon, co. Donegal; Loughgall, Lowry's Lough, and Loughgilly, co. Armagh (W. F. J.); S. Dublin, Wicklow, Wexford (H. C.).

Loricera pilicornis, F.—Donegal, Antrim, Down, Armagh, Louth, Dublin, Kildare, Wicklow, Wexford, Cork.

Clivina fossor, L.—Donegal, Antrim, Down, Armagh, Cavan, Louth, Meath, Dublin, King's Co., Wicklow, Wexford, Cork.

C. collaris, Herbst.—Portsalon, co. Donegal (R. S.).

Dyschirius thoracicus, Rossi.—Portmarnock and Portrane, co. Dublin (McN.); Estuary of the Boyne, co. Louth (H. C.).

D. obscurus, Gyll.—A single specimen taken by Haliday at Lough Neagh is in the Science and Art Museum, Dublin.

D. politus, Dej.—near Belfast (A. H. and R. P.); Ardara and Coolmore, co. Donegal; Portstewart, co. Antrim (W. F. J.); strand at Killiney, co. Dublin (H. C.).

D. salinus, Schaum.—Portsalon, co. Donegal (R. S.); near Belfast (A. H.); Portrane, co. Dublin (Mc.N.); shore at Wicklow (H. C.).

D. æneus, Dej.—Near Belfast (R. P.); "Ireland" (S. M.).

D. globosus, Herbst.—Coolmore, co. Donegal; Armagh, near Newtown Hamilton, co. Armagh (W. F. J.); near Belfast (A. H.); Dublin district (McN.); Murrough of Wicklow (H. C.).

Broscus cephalotes, L.—Ballintoy, co. Antrim (W. D.); Termonfeckin, co. Louth; S. Dublin, Wexford (H. C.); Dublin district (McN.); Coolmore, co. Donegal; Greenore, co. Louth; Greystones, co. Wicklow (W. F. J.); Tramore, co. Waterford (E. C.).

Badister bipustulatas, F.—Donegal, Antrim, Down, Armagh, Cavan, Louth, Dublin, Wicklow, Wexford, Cork, Kerry, Great Aran Island.

B. sodalis, Duft.—Near Belfast (A. H.).

Chlænius vestitus, Payk.—Coney Island, Lough Neagh (W. F. J.); banks of River Dodder, near Dublin (McN.); Rathfarnham, co. Dublin (S. M.); River Dodder, Cot Brook, Glencullen River, Loughlinstown River, co. Dublin (H. C.); Tallaght, co. Dublin (J. N. H.).

C. nigricornis, F.—Near Belfast (A. H.); Coolmore and banks of Erne above Ballyshannon, co. Donegal; shore of Lough Neagh at Maghery; Lowry's Lough, Armagh (W. F. J.); Tallaght, co. Dublin (J. N. H.); co. Cork (M. B.).

C. HOLOSERICEUS, F.—Shore of Lough Derg, near Killaloe, co. Clare (S. Stevens); near Athy, co. Kildare (S. M.).

STENOLOPHUS ELEGANS, DEJ.—Lowry's Lough, Armagh (W. F. J.).

ACUPALPUS EXIGUUS, DEJ. V. LURIDUS, DEJ.—Near Belfast (A. H.); Clogher Head, co. Louth (H. C.).

BRADYCELLUS PLACIDUS, GYLL.—Ballycastle, co. Antrim (E. C.); Loughgilly, co. Armagh (H. L. J. and W. F. J.).

B. COGNATUS, GYLL.—Near Belfast (A. H.); near Newtown Hamilton, co. Armagh (W. F. J.).

B. DISTINCTUS, DEJ.—Stormount, co. Down (W. H. P.); Vale of Avoca, co. Wicklow (Dr. S.); S. Louth, Courtown, co. Wexford (H. C.).

B. VERBASCI, DUFT.—Donegal, Antrim, Down, Armagh, Louth, Dublin, Wicklow, Wexford.

B. HARPALINUS, DEJ.—Portballintrae, co. Antrim (B. T.); near Newtown Hamilton, co. Armagh (W. F. J.); S. Dublin, Wicklow (H. C.).

B. COLLARIS, PAYK.—Dublin district (McN.).

B. SIMILIS, DEJ.—Armagh, near Newtown Hamilton, co. Armagh; Carlingford, co. Louth (W. F. J.); S. Louth, S. Dublin (H. C.).

HARPALUS PUNCTATULUS, DUFT.—Near Dublin (Dr. P.).

H. RUPICOLA, STURM.—Greenore, co. Louth (J. N. H. and W. F. J.).

H. PUNCTICOLLIS, PAYK.—Near Belfast (A. H.); Portmarnock, co. Dublin (McN.); S. Louth, Courtown, co. Wexford (H. C.).

H. RUFIBARBIS, F.—Armagh (W. F. J.); Loughgilly, co. Armagh (H. L. J.).

H. RUFICORNIS, F.—Donegal, Antrim, Down, Armagh, Louth, Dublin, Wicklow, Wexford, Cork.

H. GRISEUS, PANZ.—S. Louth (H. C.).

H. ÆNEUS, F.—Donegal, Antrim, Down, Armagh, Louth, Dublin, Wicklow, Waterford, Cork, Great Aran Island.

H. CONSENTANEUS, DEJ.—Cultra, co. Down (W. H. P.); Loughgilly, co. Armagh (W. F. J.).

H. RUBRIPES, DUFT.—Near Belfast (A. H.).

H. CASPIUS, STEV.—Specimens labelled "Ireland" (S. M.).

H. LATUS, L.—Donegal, Antrim, Down, Armagh, Cavan, Louth, Dublin.

H. TARDUS, PANZ.—Greenore, co. Louth (W. F. J.); Portmarnock, co. Dublin (McN.); S. Dublin, S. Louth (H. C.).

H. IGNAVUS, DUFT.—Portmarnock, co. Dublin (McN.).

DICHIROTRICHUS PUBESCENS, PAYK.—Near Belfast (A. H.); Carlingford, co. Louth (W. F. J.); Baldoyle, co. Dublin (McN.); Estuary of the Boyne (H. C.).

ANISODACTYLUS BINOTATUS, F.—Armagh, Bellurgan, co. Louth (W. F. J.); Glengariff, co. Cork (S. M.).

STOMIS PUMICATUS, PANZ.—Cushendun, co. Antrim (S. B.); Armagh, Keady, co. Armagh (W. F. J.); near Dublin (McN.); Blackrock, co. Dublin (H. C.).

Pterostichus cuprevs, L.—Donegal, Antrim, Armagh, Louth, Dublin, King's Co., Wexford, Waterford, Cork.

P. versicolor, Sturm.—Cushendun, co. Antrim (S. B.); near Belfast (A. H.).; Ardara, co. Donegal; Armagh, Churchill, co. Armagh (W. F. J.); Dublin district (McN.); S. Louth, S. Dublin, Wicklow (H. C.); Bere Island, co. Cork (G. C.).

P. lepidus, F.—Portsalon, co. Donegal (R. S.).

P. madidus, F.—Donegal, Antrim, Down, Armagh, Cavan, Louth, Dublin, Roscommon, Cork, Kerry, Wicklow, Wexford.

P. oblongo-punctatus, F.—Ballycastle, co. Antrim (E. C.).

P. vitreus, Dej.—Ardara, co. Donegal (W. F. J.); near Belfast (A. H.); Dublin district (Mc.N.); Dublin Mts. (H. C.).

P. aterrimus, Payk.—Near Cork.

P. niger, Schall.—Ballycastle, co. Antrim (E. C.); near Belfast (A. H.); Clandeboye (W. D. and W. H. P.); Holywood, co. Down (W. H. P.); Armagh (W. F. J.); Loughgilly, co. Armagh (H. L. J.); Fathom Mt., co. Armagh, Dundalk (J. N. H.); Dublin district (McN.); Great Aran Island (S. M.); S. Louth, Dublin, Wicklow, Wexford, Cork (H. C.).

P. vulgaris, L.—Donegal, Antrim, Down, Armagh, Louth, Dublin, Roscommon, Cork, Wicklow, Wexford.

P. anthracinus, Ill.—Near Belfast (A. H.); Lough Oughter, co. Cavan (J. N. H.).

P. nigrita, F.—Donegal, Antrim, Down, Armagh, Cavan, Louth, Monaghan, Dublin, Cork, Wexford.

P. gracilis, Dej.—Near Belfast (A. H.); Loughgilly, co. Armagh (H. L. J.); Lough Oughter, co. Cavan (J. N. H.); Ardara, co. Donegal; Armagh, Carlingford (W. F. J.); S. Louth, S. Dublin (H. C.).

P. minor, Gyll.—Near Belfast (A. H.); Holywood, co. Down (W. H. P.); Lough Oughter (J. N. H.); Ardara, co. Donegal; Armagh, Maghery, Lough Neagh (W. F. J.).

P. strenuus, Panz.—Donegal, Antrim, Down, Armagh, Monaghan, Louth, Dublin.

P. diligens, Sturm.—Near Scotstown, co. Monaghan; Armagh (W. F. J.); Lough Oughter, co. Cavan (J. N. H.); S. Dublin (H. C.).

P. picimanus, Duft.—Dublin district (McN.).

P. vernalis, Gyll.—Near Belfast (A. H.); Holywood, co. Down (W. D.); Armagh, Loughilly, co. Armagh (W. F. J.); Dublin district (McN.); S. Dublin (H. C.).

P. striola, F.—Donegal, Antrim, Down, Armagh, Louth, Dublin, Roscommon, Meath, Wicklow, Wexford, Cork, Kerry.

PART II.—Synonymic List of the GENERA of the British ARANEIDEA.

BY THE REV. F. O. PICKARD-CAMBRIDGE, M.A.

(Continued from page 194.)

FAMS.:	SUP. FAMS.	GENERA.	PUBLICATION.
Araneæ Veræ Ecribellatæ. *(Continued.)*			
Thomisidæ			
	Thomisinæ	XYSTICUS, *C. KOCH. 1835.*	
		Thomisus,—*Blackw. 1861.* in pt.	Spid. Gt. Bt. Ir., p. 70.
		,, ,—*Cambr. 1871.* ,,	T.L.S., xxviii., p. 436.
		Xysticus,—*Cambr. 1879-81.*	Spid. Dor., ii., p. 294.
		,, , *Sim. 1875.*	Ar. Fr., vol. ii., p. 150.
		OXYPTILA, *SIM. 1864.*	
		Thomisus,—*Blackw. 1861.* in pt.	Spid. Gt. Bt. Ir., p. 74.
		,, ,—*Cambr. 1870.* ,,	T.L.S., xxvii., p. 405.
		Xysticus,— ,, *1878.* ,,	A.M.N.H., 5, i,, p. 121.
		Oxyptila,— ,, *1879-81.*	Spid. Dor., ii., p. 315.
		,, ,—*Sim. 1875.*	Ar. Fr., vol. ii., p. 211.
		MISUMENA, *LATR. 1804.*	
		Thomisus,—*Blackw. 1861.* in pt.	Spid. Gt. Bt. Ir., p. 88.
		Misumena,—*Cambr. 1879-81.*	Spid. Dor., ii., p. 290.
		,, ,—*Sim. 1875.*	Ar. Fr., vol. ii., p. 241.
		DIÆA, *THOR, 1870.*	
		Thomisus,—*Blackw. 1861.* in pt	Spid. Gt. Bt. Ir., p. 76.
		Diæa,—*Cambr. 1879-81.*	Spid. Dor., ii., p. 292.
		,, ,—*Sim. 1875.*	Ar. Fr., vol, ii., p. 247.
		THOMISUS, *WALCK. 1805.*	
		,, ,—*Blackw. 1861.* inpt.	Spid. Gt. Bt. Ir., p. 90.
		,, ,—*Cambr. 1879-81.*	Spid. Dor., ii., p. 287.
		,, ,—*Sim. 1875.*	Ar. Fr. vol. ii., p. 249.
		PISTIUS, *SIM. 1875.*	
		Thomisus,—*Cambr.*	T.L.S., xxvii., p. 409.
		Misumena,— ,, *1879-81.*	Spid. Dor., ii., p. 534.
		Pistius, *Sim. 1875.*	Ar. Fr., vol. ii., p. 257.
	Philodrominæ		
		PHILODROMUS, *WALCK. 1825.*	
		Philodromus,—*Blackw. 1861.* in part.	Spid. Gt. Bt. Ir., p. 91.
		Philodromus,—*Cambr. 1879-81.*	Spid. Dor., ii., p. 325.
		,, ,—*Sim. 1875.*	Ar. Fr., vol. ii., p. 266.

FAMS.:	SUB. FAMS.	GENERA.	PUBLICATION.
Araneæ Veræ Ecribellatæ.			
Thomisidæ.			
	Philodrominæ (*Continued.*)		
		THANATUS, *C. KOCH. 1837.*	
		Thanatus,—*Cambr. 1870.* in pt.	T.L.S., xxvii., p. 438.
		,, ,— ,, *1879-81.*	Spid. Dor. ii., p. 335.
		,, ,—*Sim. 1875.*	Ar. Fr., vol. ii., p. 314.
		TIBELLUS, *SIM. 1875.*	
		Philodromus,—*Blackw. 1861.* in part.	Spid. Gt. Bt. Ir., p. 100.
		Thanatus,—*Cambr. 1874.* in pt.	T.L.S., xxx., p. 331.
		Tibellus,— ,, *1879-81.*	Spid. Dor., ii., p. 338.
		,, , *Sim. 1875.*	Ar. Fr.. vol. ii., p. 307.
Sparassidæ.			
		MICROMMATA, *LATR. 1804.*	
		Sparassus,—*Blackw. 1861.*	Spid. Gt. Bt. Ir., p. 101.
		Micrommata,—*Cambr. 1879-81.*	Spid. Dor., ii., p. 340.
		,, ,—*Sim. 1875.*	Ar. Fr., vol ii., p. 337.
Clubionidæ			
	Clubioninæ		
		CLUBIONA, *LATR. 1804.*	
		Clubiona,—*Blackw. 1861.* in pt.	Spid. Gt. Bt. Ir., p. 121.
		,, ,—*Cambr. 1879-81.*	Spid. Dor., i., p. 21.
		,, ,—*Sim. 1878.*	Ar. Fr., iv., p. 210.
		CHIRACANTHIUM, *C. KOCH. 1839.*	
		Clubiona,—*Blackw. 1861.* in pt.	Spid. Gt. Bt. Ir., p. 135.
		Chiracanthium,—*Cambr. 1879.*	Spid. Dor., i., p. 32.
		Chiracanthium,—*Sim. 1878.*	Ar. Fr., iv., p. 240.
	Anyphæninæ		
		ANYPHÆNA, *SUND. 1833.*	
		Clubiona,—*Blackw. 1861.* in pt.	Spid. Gt. Bt. Ir., p. 131.
		Anyphæna,—*Cambr. 1879-81.*	Spid. Dor., i., p. 33.
		,, ,—*Sim. 1878.*	Ar. Fr., iv., p. 265.
	Micariinæ		
		MICARIA, *WESTR. 1851.*	
		Drassus,—*Blackw. 1861.* in pt.	Spid. Gt. Bt. Ir., p. 118.
		,, ,—*Cambr. 1870.* ,,	T.L.S., xxvii., 412.
		Micaria,— ,, *1879-81.*	Spid. Dor., i., p. 11.
		,, ,—*Sim. 1878.*	Ar. Fr., iv., p. 5.
		MICARIOSOMA, *Sim. 1878.*	
		Drassus,—*Blackw. 1861.*	Spid. Gt. Bt. Ir., p. 120.
		Phrurolithus,—*Cambr. 1879-81.*	Spid. Dor., i., p. 44.
		Micariosoma, *Sim. 1878.*	Ar. Fr., iv., p. 271.

Araneæ Veræ Ecribellatæ.

FAMS.: SUB. FAMS.	GENERA.	PUBLICATION.
Clubionidæ (*Continued.*)		
Zorinæ	ZORA, *C. KOCH. 1848.*	
	Hecaerge,—*Blackw. 1833, 1861.*	Spid. Gt. Bt. Ir., p. 41.
	,, ,—*Cambr. 1879-81.*	Spid. Dor., i., p. 42.
	Zora,—*Sim. 1878.*	Ar. Fr., iv., p. 314.
	AGROECA, *WESTR. 1861.*	
	Agelena,—*Blackw. 1833, 1861.*	Spid. Gt. Bt. Ir., p. 159.
	Agroeca,—*Cambr. 1879-81.* in pt.	Spid. Dor., i., p. 34.
	Liocranum,—*Cambr. 1879.* in pt.	Spid. Dor., i., p. 37.
	Drassus,—*Cambr. 1871.* in pt.	T.L.S., xxvii., p. 413.
	Agroeca,—*Sim 1878.*	Ar. Fr., iv., p. 298.
	LIOCRANUM, *L. KOCH. 1866.*	
	Clubiona,—*Blackw. 1861,* in pt.	Spid. Gt. Bt. Ir., p. 132.
	Liocranum,—*Cambr. 1879-81,*	Spid. Dor., i., p. 37.
	Liocranum,—*Sim. 1878,* in pt.	Ar. Fr., vol. iv., p. 288.
Agelenidæ		
Argyronetinæ	ARGYRONETA, *LATR. 1804.*	
	,, ,—*Blackw. 1861.*	Spid. Gt. Bt. Ir. p. 136.
	,, ,—*Camb. 1879-81.*	Spid. Dor., ii., p. 471.
	,, ,—*Sim. 1875.*	Ar. Fr., vol. ii., p. 27.
Coelotinæ	COELOTES, *BLACKW. 1841.*	
	Clubiona,—*Blackw. 1833,* in pt.	Lon. Ed. Phil. Mag., 3, iii., p. 436.
	Coelotes,— ,, *1861.*	Spid. Gt. Bt. Ir., p. 169.
	,, ,—*Cambr. 1879-81.*	Spid. Dor., i., p. 59.
	,, ,—*Sim. 1875.*	Ar. Fr., vol. ii., p. 30.
Cicurinæ	CICURINA, *MENGE, 1871.*	
	Tegenaria,—*Cambr. 1879-81.* in part.	Spid. Dor., i., p. 65.
	Coelotes,—*Cambr. 1879-81.* inpt.	Spid. Dor., ii., p. 472.
	Cicurina,—*Sim. 1875.*	Ar. Fr., vol ii., p. 20.
	CRYPHOECA, *THOR. 1870.*	
	Tegenaria,—*Blackw. 1861.* in pt.	Spid. Gt. Bt. Ir., p. 168.
	Coelotes,—*Cambr. 1863.* in pt.	Zoologist, 1863, p. 8572.
	Cryphoeca,—*Cambr. 1879-81.*	Spid. Dor., i., 58; ii., p. 474.
	,, ,—*Sim. 1875.*	Ar. Fr., vol ii., p. 50.
Ageleninæ	TEGENARIA, *LATR. 1804.*	
	Tegenaria,—*Blackw. 1861.*	Spid. Gt. Bt. Ir., p. 163.
	,, ,—*Cambr. 1879.81.*	Spid. Dor., i., p. 61.
	,, ,—*Sim. 1875.*	Ar. Fr., vol. ii., p. 54.

FAMS.: SUB. FAMS.	GENERA.	PUBLICATION.
Araneæ Veræ Ecribellatæ.		
Agelenidæ		
Ageleninæ (Continued.)	AGELENA, *WALCK. 1805.*	
	Agelena,—*Blackw. 1861,* in pt.	Spid. Gt. Bt. Ir., p. 152.
	,, ,—*Cambr. 1879-81.*	Spid. Dor., i., p. 67.
	,, ,—*Sim. 1875.*	Ar. Fr., vol. ii., p. 109.
	TEXTRIX, *SUND. 1833.*	
	Textrix,—*Blackw. 1861,* in pt.	Spid. Gt. Bt. Ir., p. 171.
	,, ,—*Cambr. 1879-81.*	Spid. Dor., i., p. 65.
	Agelena,— ,, *1863,* in part.	Zoologist, 1863, p. 8571.
	,, ,—*Sim. 1875.*	Ar. Fr., vol. ii., p. 116.
Hahniinæ	HAHNIA, *C. KOCH. 1841.*	
	Agelena,—*Blackw. 1861,* in pt.	Spid. Gt. Bt. Ir., pp. 155-6-7-8.
	,, ,—*Cambr. 1861.* ,,	A.M.N.H., June, 1861.
	Hahnia,—*Cambr. 1879-81.*	Spid. Dor., i., p. 68.
	,, ,—*Sim. 1875.*	Ar. Fr., vol. ii., p. 129.
Lycosidæ		
Dolomedinæ	OCYALE, *AUD. 1827.*	
	Dolomedes,—*Blackw. 1861.* in pt.	Spid. Gt. Bt. Ir. p. 37.
	Ocyale,—*Cambr. 1879-81.*	Spid. Dor., ii., p. 345.
	,, ,—*Sim. 1876.*	Ar. Fr., vol. iii., p 226.
	DOLOMEDES, *LATR. 1804.*	
	Dolomedes,—*Blackw. 1861.* in pt.	Spid. Gt. Bt. Ir. pp. 37,
	,, ,—*Cambr. 1879-81.*	Spid. Dor., ii., p. 347.
	,, ,—*Sim. 1876.*	Ar. Fr.. vol. iii., p. 228.
Lycosinæ	PIRATA, *SUND. 1833.*	
	Lycosa,—*Blackw. 1861.* in part.	Spid. Gt. Bt. Ir. pp. 34, 36.
	,, ,—*Cambr. 1871.* ,,	T.L.S., xxvii., p. 396.
	Pirata,— ,, *1879-81.*	Spid. Dor., ii., p. 350.
	,, ,—*Sim. 1876.*	Ar. Fr., vol. iii., p. 294.
	LYCOSA, *LATR. 1804.*	
	Lycosa,—*Blackw. 1861.* in part.	Spid. Gt. Bt. Ir. p. 16.
	,, ,—*Cambr.* in part.	T.L.S., xxvii., p. 398.
	Trochosa,—*Cambr. 1879-81.*	Spid. Dor., ii., p. 356.
	Tarentula,—*Cambr.* ,, in pt.	Spid. Dor., ii., p. 364.
	Lycosa,—*Sim. 1876.*	Ar. Fr., vol. iii., p. 233.
	PARDOSA, *C. KOCH. 1848.*	
	Lycosa,—*Blackw. 1861.* in part.	Spid. Gt. Bt. Ir., p. 27.
	,, ,—*Cambr. 1879-81.*	Spid. Dor., ii., p. 369.
	Pardosa,—*Sim. 1876.*	Ar. Fr., vol. iii., p. 304.

FAMS.:	SUB. FAMS.	GENERA.	PUBLICATION.
Araneæ Veræ Ecribellatæ. (*Continued.*)			
Oxyopidæ			
		OXYOPES, *LATR. 1804.*	
		Sphasus,—*Blackw. 1861.*	Spid. Gt. Bt. Ir., p. 43.
		Oxyopes,—*Cambr. 1879-81.*	Spid. Dor., ii., p. 552.
		„ ,—*Sim, 1876.*	Ar. Fr., vol. iii., p. 215.
Attidæ			
		SALTICUS, *LATR. 1804.*	
		Salticus,—*Blackw. 1861.*	Spid. Gt. Bt. Ir., p. 64.
		„ ,—*Cambr. 1879-81.*	Spid. Dor., vol. ii., 567.
		„ ,—*Sim. 1876.*	Ar. Fr., vol. iii., p. 6.
		SYNAGELES, *SIM. 1876.*	
		Synageles,—*Cambr. 1886.*	P.D.N.H.S., vii., p. 7.
		„ ,—*Sim. 1876.*	Ar. Fr., vol. iii., p. 14.
		HYCTIA, *SIM. 1876.*	
		Salticus,—*Blackw. 1861.* in pt.	Spid. Gt. Ir. p. 59.
		Hyctia,—*Cambr. 1889.*	P.D.N.H.S., x., p. 124.
		„ ,—*Sim. 1876.*	Ar. Fr., vol. iii., p. 18.
		MARPTUSA, *THOR. 1877.*	
		Salticus,—*Blackw. 1861*, in pt.	Spid. Gt. Bt. Ir., p. 63.
		„ ,—*Cambr. 1869-72* in pt.	P.Z.S. and T.L.S., xxviii., p. 527.
		Marpessa,—*Cambr. 1879-81.*	Spid. Dor., vol. ii. p. 554.
		Marpissa,—*Sim. 1876.*	Ar. Fr., vol. iii. p. 23.
		DENDRYPHANTES, *C. KOCH. 1837.*	
		Dendryphantes,—*Cambr. 1889.*	P.D.N.H.S., x., p. 128.
		„ ,—*Sim. 1876.*	Ar. Fr., vol. iii., p. 35.
		PHILÆUS, *THOR. 1870.*	
		Salticus,—*Cambr. 1870*, in pt.	T.L.S.. xxviii. p. 433.
		Philæus,— „ *1879-81.*	Spid. Dor.,vol. ii. p. 561.
		„ ,—*Sim. 1876.*	Ar. Fr., vol. iii. p. 45.
		EPIBLEMUM, *HENTZ. 1832.*	
		Salticus,—*Blackw. 1861.* in pt.	Spid. Gt. Bt. Ir., p. 47.
		„ ,—*Cambr. 1863.* „	Zoologist, 1863, p. 8597.
		„ ,— „ *1870.* „	T.L.S., xxvii., p. 399.
		Calliethera,—*Cambr. 1863.*	Zoologist, 1863, p. 8597.
		Epiblemum,—*Cambr. 1879-81.*	Spid. Dor.,vol. ii., p. 391.
		Calliethera,—*Sim. 1876.* „	Ar. Fr., vol. iii., p. 62.
		HASARIUS, *SIM, 1871.*	
		Salticus,—*Blackw. 1861.* in part,	Spid. Gt. Bt. Ir., p. 50.
		„ ,—*Cambr. 1861-1869.* in part.	Zoologist, 1861, 1869.
		Hasarius,—*Cambr. 1879-81.*	Spid. Dor.,vol. ii. p. 565.
		„ ,—*Sim. 1876.*	Fr., Ar., vol. iii. p. 79.

(*To be continued.*)

GEOLOGICAL NOTES OF THE SCENERY OF THE KILLARNEY DISTRICT.

BY CHARLES WHITE.

(*Continued from page 190.*)

Sometimes these patches of drift assume the appearance of shelves or raised beaches, but these are scored and gashed by the watercourses which though generally dry in summer yet in the season of heavy rain carry off a large volume of hill-side drainage. Nearer the base much of the sand has been washed away, and the commons and the fields are left as full of great stones as a churchyard in a thickly-populated district.

Much of the surface of the drift is uncultivated, but in places a farmhouse and patches of potatoes and meadow vary the prevalence of gorse and heather. Too often it is painful to watch how much patient labour is wasted on an ungrateful soil. The most plentiful crop is that of stones, which are heaped up sometimes in the centres of the fields, and sometimes at the edges, and sometimes are built up into partition walls. In one damp hollow where the drainage was left to nature I saw the Osmunda flourishing in great luxuriance. The best use that the drift could be put to would be to plant it, as has been done on one side, with different species of fir, which seem to take very kindly to the barren earth, and in these days of demand for telegraph poles the practice promises to be remunerative.

Not much suggestion of beauty attaches to the drift, and the prospect is one of general bareness and poverty, except when relieved by masses of yellow of the flowering gorse; and, dry as the hillside appears in the summer, the occasional stepping stones by the pathside indicate that the rills which you now see may on occasions flush up into rivulets and even rivers. Here and there may be seen round pits, about 60ft. across at the brim, and 20ft. deep, which may be taken to be occasioned by the subsidence of the drift into caverns made in the underlying limestone by running water, very much in the way that is sometimes experienced so disagreeably in the town of Northwich.

That the set of the currents of the glacial sea was southwards and diverted S.-W. is indicated by the fact that this bed of drift and other similar ones are only found on the north side of the mountain ridge. Whether this sea was ice-covered is not a matter of much importance—probably it was—but as the blocks of Old Red are of local origin, we need not trouble ourselves about ice-borne boulders.

The absence of the drift from Torc westward to the Gap of Dunloe opens out many points of interest, both with reference to the scenery as well as to the causes of that absence. The same sea must have dashed up against the sandstone wall, and there was the same sandstone to furnish *débris* and blocks from a continuation of the same drift, but there is an agent of removal which I must go a little into the physical geography of the district to make plain. Looking southwards into the glen of which Torc and the Eagle's Nest are the portals, you see an assemblage of mountain forms which extend to the watershed. They are all over 2,000 feet high. Passing westwards, the ridge that commences with the Eagle's Nest offers peaks that are called Tomies and the Purple Mountain, and then separated by the narrow pass of the Gap of Dunloe there rises up a cluster of the loftiest mountains in Ireland—Magillicuddy's Reeks. These are among the first hills that the Atlantic clouds, heavily charged with moisture, meet with, and the precipitation of water is sometimes enormous. A large portion of the drainage from the Reeks finds its way down a long slope called the Black Valley, forming in its course two or three little lakes, and then, when reinforced by the contributions from the hills which extend southwards, a much larger one—the Upper Lake, about one-and-a-half miles long, but not so wide.*

The exit from the Upper Lake is by a small side opening, which is of comparatively recent formation, and which is so inefficient as an exit that I have seen the water of the lake raised many feet by one day's rain. Before this side opening was made the drainage must have flowed along the axis of the valley, and the water have stood at a considerably higher level. It must then have passed through a short valley called the Long Range, and have entered the Lower Lakes, then one, and also at a much higher level.

This is the agent of removal, then, by which all trace of the presence of the glacial sea has been removed from this portion of the district. It is not necessary to assert that the precipitation was greater in past times than to-day; but in any case the rate of escape must in glacial times have been much slower. If it fell in the shape of snow a glacier would be formed, and that it did so result the marks of glaciation in the Black Valley, along the Upper Lake and the Long Range, and on the sides of Torc, are most convincing evidence.

In tracing the course of this glacier of the Reeks we are confronted by the same problem that Switzerland and other countries of ancient ice offer, viz., the high level, keeping in mind the amount of the present drainage. Yet the ice markings cannot be gainsaid, and we have no other resource than to believe that part of the ice stream left the general mass and flowed over the col which separates the Black Valley from the Gap of Dunloe, and receiving increments from the side valleys finally emerged on the north side of the Gap, where its terminal moraine is visible to this day. Possibly in the earlier periods of the glacial era the main body of the Reeks Glacier flowed in a N.E. direction, and then impinging on Torc was diverted towards the west by that mountain, and by the general set of the Arctic currents until the parent and the infant glaciers joined forces once more. But in later times of shrinking and retrocession the Gap Glacier ended as I have dedescribed, and the only union would be that of the effluent streams of the two. If the practical result of such a circle of drainage be the washing away therefrom the droppings of the glacial ocean, another effect must also be considered. In the post-glacial changes of the last 200,000 years, more or less, the exposed limestone must have suffered a considerable abstraction from its bulk which the strata outside the sphere have escaped. Free scope must have been afforded to the ordinary denuding agencies in their action on the uncovered rocks of the locality. When we note the limestone as it emerges from its mantle of 80 yards thick and compare its fresh, bluish grey, and crystalline texture with the bleached and worn appearance of the fragments below, whether islands, or peninsulas, or scattered cliffs, or pinnacles hidden amongst dense masses of foliage, we are able to appreciate to the full the preservative power exerted by the drift.

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* NOTE.—This is generally considered the most beautiful of the lakes, having several well-wooded islands, and being entirely shut up by hills on all sides.

Under the drift the greatest denudation that can go on is that effected by the solvent power of acidulated water. We may take it for certain that here, as in all other carboniferous limestone strata the channels of drainage are becoming gradually enlarged from chinks to caverns, the roofs of which in time will disappear, and narrow valleys result. The phenomenon of an underground rivulet bursting out in full stream into the open air is seen at Muckross, as in the other mountain limestone districts—Malham Cove, Gordale Scar, Ilam, and Bakewell—it has in the chalk and other water lime formations. I remember well on examining strata in Sutherland that are at least pre-Silurian, if not pre-Cambrian, how I seemed to recognize an old friend in the gush by many heads of an abundant stream, out of a bed of perhaps the earliest known limestone in these isles, if not in the whole world.

Behind the Muckross Hotel is a patch of swampy ground, where the drift ends and the limestone emerges, where a mill pool has been formed by damming the water which rises from the underground in many little springs and which in some places may be seen raising the grey mud at the bottom in never-resting little heaps. The mill has been removed, but the dam remains, and the overflow is a stream of brilliantly clear water, the sight of which is most refreshing to the person who comes from a country where pollution of rivers is the universal practice. The stream is chokeful of green vegetation, great aquatic plants rising out of it, and long waving weeds swaying forever from side to side in the current, and yet no tinge of discoloration bedims the perennial flow. Always pellucid, always cheerfully babbling over the enamelled stones, an emblem of purity and ceaseless beneficial activity, it is always attractive and suggestive of subjects for meditation. Nor was the parent pool without its own peculiar charm and interest for a student of natural history. The miniature lake extends half round a small but thick wood, through which the observer may creep and, himself unseen, watch the proceedings of the aquatic birds which frequent the pool and find safety amid the thick encircling fringe of reeds. The wild duck and teal sailing about with their young broods, coots and dabchick diving sometimes for sport and sometimes for food, herons in stately watch, could be seen, and many others, provided the spectator would remain perfectly quiet. In the evening many birds' notes could be distinguished by their song, chief amongst them being the spinning-wheel hum of the night jar and the sweet note of the black cap. This swampy ground of which the pool and the stream are the centres forms a happy valley swarming with vital activities of all kinds, a symphony in which lime is the motive. Plants in their superabundance of fecundity lend themselves to the growth of insect populations—the trout and eels grow fat on the plenty of luscious water snails and become more delicate fare for the heron, and so on and so on. The chain may be long, but the links are closely united, and the commencement may be found in the issue of underground waters from calcareous strata.

THE HORSES GLEN.

Immediately beneath the crest of Mangerton and to the west is a tarn, which I have mentioned previously, called the Punch Bowl. It is separated by a very narrow ridge from a very deep and narrow glen, the sight of which from the ridge cannot fail to evoke feelings of amazement and even of awe. The descent from your feet is not absolutely precipitous, but exceedingly difficult and dangerous, whilst the sides of the glen, and especially the south, present bare, rocky walls about 1,500 feet high, which seem, if not vertically steep, to afford no possible foothold for the climber. On the floor of the glen may be seen two small lakes.

This is the Horses Glen, which is considered by some critics to be the most striking natural phenomenon in the whole district of Killarney, and which doubtless does affect the mind the most if not the most pleasantly. I hesitate to quote it as a stupendous instance of long continued denudation, because it has always seemed to me that such a deep gash in the mountain side must have had other causes than the wear and tear of atmospheric disintegration. For we find that this glen, as well as some of the country adjoining, has been subject to the influence of volcanic eruption—either whilst still submarine, or when it was slowly rising from the world of waters. One side of the Punch Bowl and both sides of the Horses Glen—part of the mountain of Crohane—consist of the metamorphosed Old Red, whilst the small peak of Benaunmore still offers a specimen of the original but now consolidated lava which welled up from the unknown igneous depths of the interior of the globe. I take it that the volcanic ash of the Government surveyors is, as I have said, but baked Old Red, and what it has gained by its fiery acquaintance is increased hardness but diminished cohesiveness. The layers of the original deposit are done away with, the tendency to split up into joints is much more marked, and hence much more amenable to the influence of either sub-aqueous or sub-aërial denudation.

In bringing these notes to a conclusion I beg to remark that, desiring to keep attention to one or two points, I have purposely omitted any reference to a number of attractions which Killarney offers to everyone, but to the naturalist in especial. For instance, there are many interesting problems in the geology of the district to which I have not even alluded, because their solution did not immediately relate to the production of the present scenery.

In the course of many happy holidays spent in this neighbourhood, I have from time to time met with scientific botanists, who all expressed their satisfaction with the results of their visits. Entomologists are not so frequently seen as they ought to be, for they will find here a capital hunting ground, and one that is not as yet thoroughly worked up. With regard to other classes of visitors, the follower of the gentle craft will have sport enough if he go at the right time, but though nature has done her utmost in providing facilities for the growth and multiplication of fishes, man has been potent in counteraction, and as the guide book sorrowfully says:—"The district might be one of the best for angling, but somehow it is not." Here too are mountains for the athlete to scale, which are difficult and not without danger—the latter qualification to him an absolute necessity.

To each visitor be his proper part assigned, and then as Dean Hole says:—"Killarney will be a name to call up pleasant memories—a word that will ever afterwards have a strong, strange power upon the heart."

GOSSIPING NOTES ON BRITISH COLEOPTERA.

BY G. A. LEWCOCK.

(Continued from page 88.)

Calathus, Bonelli.—In the recent "Catalogue of British Coleoptera," by Fowler and Sharp (1893), the members of this genus are grouped with Taphria, Pristonychus, Sphodrus, Anchomenus, and

Olisthopus, under the tribal term Anchomenina. They appear to be placed in the same order as that adopted in Canon Fowler's "Coleoptera of the British Islands" (1887). In the catalogue by Matthews and Fowler (1883) the genus Masoreus was likewise included; but the Masoreina are now considered to be undoubted Truncatipennes, and are placed in a distinct tribe by themselves after the Trechina by both Sharp and Fowler.

Over a hundred species are known to inhabit the northern hemisphere, but seven only are found in the British Isles, and these are mostly of a uniform black or dark-brown colour. *C. melanocephalus* has a red thorax, and *C. micropterus* has the side margins of the thorax narrowly red or testaceous. With the exception of the last species, all are tolerably common and easily obtained by the student in his early collecting days from various localities, under stones, at roots of grass, and in damp places.

C. cisteloides, Panz.—Insect apterous; black. Elytra with two rows of pores, either on the fifth and third interstices or the striæ. The legs are sometimes entirely red, or red with pitchy femora, or entirely black. Common and generally distributed.

C. fuscus, F.—Insect winged; fuscous brown. Elytra finely striated, striæ impunctate, third interstice with two or three pores. This species is sometimes confounded with *C. mollis* and *C. flavipes*, but differs from both the latter in having the inner side of the first joint of the tarsi hollowed out or flattened. Generally distributed in the South of England, and more often found under dung patches. It appears to be commoner in sandy places, such as Deal, where it has been taken by Mr. Newbery and others. Also recently captured by myself on clay soil on banks of Grand Junction Canal near Willesden.

C. flavipes, Fourc.—Insect apterous; shining black. Exceedingly like *C. cisteloides*, but distinguished from that species by the absence of pores on the fifth striæ. Rather local, but frequently found in some numbers. The late Mr. R. Gillo took it freely on the sand and sandhills at Burnham under refuse, roots of plants, &c., but always near the shore. Mr. G. C. Hall recorded it from Deal sandhills, stating that it was likely to be overlooked "on account of its resemblance to a small *cisteloides*, but it has a neater and more delicate appearance." The species occurs also at Rainham (Essex), Liverpool district, and is also recorded from Dublin.

C. melanocephalus, L.—Insect apterous; head black, thorax red or yellowish red, border of posterior angles narrow, not raised. A very common species throughout the British Islands.

Var. *nubigena*, Haliday.—First discovered by Haliday in Ireland. It appears to be fairly common on the mountains in Wicklow, and but recently Mr. H. G. Cuthbert took several, very kindly sending me some half-dozen examples. The main difference between the variety and type form is that var. *nubigena* has the thorax clouded with black, and occasionally entirely black. The legs and antennæ also are darker. It seems to occur in high latitudes only.

The late Mr. R. Gillo had "a specimen, taken on Lansdown, with the thorax dark pitchy and the margins only reddish; the antennæ dark in the middle and the legs much darker than the type form of *C. melanocephalus*, especially the tibiæ and tarsi; but as I have specimens showing every gradation between it and the type, it cannot be anything more than a melanic variety, which seems to occur in high localities."

C. micropterus, Duft.—Insect apterous. The principal distinction between this and the preceding species appears to be in the thorax, which is dark instead of red, with margins testaceous; the border of posterior angles is broad and slightly reflexed. Generally found in mountainous districts. I received my specimens from Mr. W. E. Sharp, who takes it on the Welsh mountains. Mr. R. Wilding also records it from Snowdon and Llangollen, under stones.

C. piceus, Marsh.—Insect apterous; black. Tarsi simple in both male and female. The thorax is much more contracted behind than in the other species of this genus which occur in the British Islands, and the beetles are altogether broader. I have found specimens at Rainham (Essex), but it appears to be commoner in sandy places. Mr. E. A. Newbery and Mr. C. G. Hall record it from Deal and Dover; Mr. R. Wilding, at roots of trees and under loose bark, Eastham Wood, Cheshire; Bath, Mr. R. Gillo; Hadley Woods, Mr. Heasler.

REPORTS OF SOCIETIES.

CARLISLE ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY.

The third monthly meeting of this Society was held on August 2nd, and, in the absence of the President, Mr. Robert Leighton took the chair. Mr. E. W. Day read a paper entitled, "Notes and observations on a trip to Loch Lomond," in which he enumerated a list of objects which called for attention, and remarked the conditions under which they were seen. During the discussion one of the members casually remarked having seen a whitish cockroach, and forthwith an animated debate ensued on these troublesome pests. As usual, there was a large display of exhibits.

August 16th.—Mr. George Wilkinson read a paper on the "Entomological productions of the first four months of 1894." This paper, a highly interesting one, was very much appreciated by the Entomological section. Mr. Wilkinson gave a list of the larvæ and pupæ taken by him, giving the date of their capture, localities, how they were to be taken and method of taking.

Amongst the several subjects discussed was the "sagacity of rats," one member giving an instance where the rat was in the habit of leaping over a trap which had been placed on a beam to intercept it. Among the exhibits were a large number of preserved larvæ, by Mr. J. Wilkinson. A specimen "death's head" moth, taken in this district last year, was presented to the Tallie House Museum.—JNO. BUCKLE.

CITY OF LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY.

Tuesday, 19th June, 1894.—The President in the chair.

EXHIBITS.—By Dr. F. J. Buckell, a specimen of *Pararge egeria*, sent by Mr. Hodges, from Guernsey. It was practically identical with the Linnæan type (*egeria*) which differs from the ordinary British form (really *egerides*) in having the spots dark brownish orange instead of straw coloured.

By Mr. Battley, *Tæniocampa gracilis*, *munda*, *populeti*, *incerta*, and *stabilis*, all from Broxbourne; the latter was a specimen with stigmata confluent in both fore wings, a single line surrounding both. Mr. Bate stated that he had this year bred a similar specimen.

By Mr. Clark, several specimens of *Selenia lunaria*, forming part of a brood which had been gradually emerging since Christmas last.

By Captain Thompson, *Coccyx argyrana*, *Adela degeerella*, *Gelechia alcella*, *Teleia luculella*, and *Laverna atra*; also cocoons of *Plusia festucæ* sent by Mr. Arkle from the vicinity of Chester; he read a letter from that gentleman to the effect that he had taken them on the 13th June, spun upon leaves of sedge. These leaves were bent downwards at an obtuse angle by the contracting of the silk of the cocoon; this did not take place when they were made on the Yellow Iris (which is rarely the case), upon which the larva readily feeds.

By Mr. Bacot, bred specimens of *Cucullia verbasci* from Norfolk and Wales, and a larva which he believed to be *Brephos notha*.

By Mr. Prout, a specimen of *Melanippe sociata* of a yellowish tinge; this specimen had lain in pupa during the winter, the rest of the brood having emerged in the previous autumn.

Dr. Francis Buckell, of Romsey, read a paper on "Pollen Grains," and exhibited many original drawings illustrating the diversity of form among these objects. He suggested that this difference in form was probably due to evolution, regulated to a large extent by the varied structure of the organ of the different insects by which each species of flower was fertilised. The magnifying power used was 300 diameters.

Tuesday, 3rd July, 1894.

EXHIBITS.—Mr. Clark, a large number of Australian Lepidoptera received from Mr. E. Anderson; also living larvæ of *Selenia lunaria*.

Mr. May, an empty cocoon of *Plusia moneta* from Weybridge. He stated that the moth had emerged from this a few days previously.

Mr. Hollis, bred specimens of *Ocneria dispar*.

Mr. Prout, a series of *Eupithecia assimilata* bred from five different females taken in 1893, the specimens showing a decided tendency to heredity.

Dr. Sequeira, *Meliana flammea*, *Simyra venosa*, and *Macrogaster arundinis*, all from Wicken Fen.

Dr. Buckell, living larvæ of *Nemeobius lucina*, three weeks old; also series of *Lycæna adonis* and *Nisoniades tages*. He called attention to the presence in the males of *N. tages* of a fold along the basal half of the costal margin of the fore wings. The same character is also present in *Pyrgus malvæ*, being probably a scent organ.

Mr. Bacot, full grown larvæ of *Amphidasys prodromaria* feeding on cherry.

Mr. Battley, flowers of *Orchis pyramidalis*, *Ophry apifera* (Bee orchis), and *Gymnadenia conopsea* (Scented orchis), all from Reigate.

Mr. Bate said that he had made further inquiries as to the specimen of *Polyommatus virgaureæ* exhibited by him at the last meeting, and that no doubt seemed to exist as to the authenticity of the specimen, which was taken in July or August, 1880.

Tuesday, 17th July, 1894.

EXHIBITS.—Mr. Oldham, a specimen of *Rumia cratægata* with very distinct transverse lines; also some rats killed by poison.

Mr. Battley, *Macrogaster arundinis*, *Hydrilla palustris*, *Herminia cribralis* and *Nascia citialis*, all from Wicken; and *Spilodes sticticalis* from Tuddenham.

Mr. May, bred specimens of *Plusia moneta*, *Geometra papilionaria* and *Ellopia fasciaria*.

Dr. Buckell, living specimens of *Bombyx quercus* received from Mr. A. J. Johnson, of Erdington, near Birmingham. He read a letter from that gentleman in which he stated that he had placed three bred specimens (two males and a female) in a box, and shortly afterwards noticed that the two males were *in cop*. He further suggested that one of them might be hermaphroditic, although they appeared to be typical males.

Captain Thompson, pupæ of *Monagria elymi* in stems of *Elymus arenarius*.

—C. NICHOLSON and A. U. BATTLEY, Hon. Secretaries.

THE SOUTH LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY.

August 9th, 1894, E. Step, Esq., President, in the chair.

Mr. A. W. Peach, of Chiswick, was elected a member.

Mr. Hall exhibited bred series of *Xanthia fulvago*, L. (*cerago*, Fb.) from Derby and Croydon, stating that it was usual to obtain more in proportion of var. *flavescens*, Esp., from the North than from the South; also bred series of *X. citrago*, L.

Mr. West, of Streatham, exhibited two males and two females of *Lasiocampa quercifolia*, L., bred from larvæ obtained in the fen district.

Mr. Adkin, on behalf of Mr. South, bred series of *Hypsipetes sordidata*, Fb. (*elutata*, Hb.), from Northwood, having very dark ground colour; bred series of *Cleoceris viminalis*, Fb., from Blatchworth, some being melanic while others were very pale; a few *Tortrix xylosteana*, L., of which one had jet black markings instead of the rich reddish brown; a long series of *Scoparia murana*, Curt., from Macclesfield; a series of *Prays curtisellus*, Don., comprising the normal and the uniformly fuscous form, collected round Macclesfield; and an exceptionally strongly-marked female of *Hepialus humuli*, L., taken at Elstree.

Mr. Croker, a long and fine series of *Leptogramma hastiana*, L., bred, from St. Anne's-on-Sea; and two exceptionally distinct specimens of *L. literana*, L., from the New Forest.

Mr. Adkin, a few specimens of *Spilosoma mendica*, Clerk., bred, from Hartlepool;

and three specimens of *Hylophila bicolorana*, Fues. (*quercana*, Schiff.), bred from New Forest larvæ, with the cocoons, upon the mechanical structure of which he made remarks.

Mr. Williams, a curiously scorched specimen of *Uropteryx sambucata*, Dup., from Highgate.

Mr. Turner, a dark specimen of *Melanippe fluctuata*, L., referable to var. *neapolisata*, Mill., taken at Brockley.

Several members made remarks upon the season and gave their collecting experiences.—Hy. J. Turner, Hon. Report Secretary.

August 23rd, E. Step, Esq., President, in the chair.

Mr. Hall exhibited two cabinet drawers of Diurni captured in Switzerland during a fortnight in July, comprising about 100 species, among which were noticed specimens of *Hesperia lincola*, O.

Mr. Filer showed a very dark *Stauropus fagi*, L., from Ashdown Forest.

Rev. J. E. Tarbat, a remarkable aberration of *Vanessa cardui*, L., from N. Wales.

Mr. Mera, *Agrotis tritici*, L., and *A. aquilina*, Hb., stating that it was considered by some persons that these were forms of one species. A discussion ensued, Messrs. Barrett, Fenn and others taking part.

Mr. Frohawk, pupæ of *Vanessa urticæ*, L., showing beautiful variation in colour induced by artificial surroundings.

Mr. Pearce, exquisite drawings and paintings by himself of plants.

Mr. Sauzé, various forms of *Formica nigra*, and contributed notes thereon.

Mr. Step, on behalf of Mr. Barber, of Brighouse, a young newt that had not yet lost its branchiæ, and a discussion ensued.

Mr. Perks, a microscopic fungus on sycamore leaves.—H. Williams, *pro* Report Secretary.

LEPIDOPTERA.

Up to the present time sugar has proved a failure here, owing, I suppose, to the unsettled state of the weather. Ragwort is now out in fine condition, and I have taken a good many various insects from off the bloom. Last evening, between 9.30 and 11, the following species occurred commonly: L. pallens, L. impura, A. nigricans, H. micacea, X. cerago, X. silago, T. orbona, H. oculea, and many others.—H. Shortridge Clarke, Sulby Parsonage, Lezayre, Isle of Man, August 18th, 1894.

NOTES.

The prospectus of the first fasciculus of the North of England Lichen flora, through the courtesy of the compiler, the Rev. W. Johnson, F.L.S., lies before us, and we cannot but congratulate him on the value of the specimens selected. This first issue includes forty specimens of these minute plants, which have been obtained chiefly from the three northernmost counties of Britain, Northumberland, Cumberland, and Durham. Of the Lecanora no less than ten specimens find a place in this fasciculus, these are followed by the Cladonia with six, while the Peltigera and Callema are represented by three specimens each, and the Ramalina by four.

The arrangement reflects great credit on the compiler, and the student will find this work brings valuable assistance to the investigation of these lowly yet interesting organisms of the vegetable world which engage his attention.

Books Received.

"Science Gossip." "Entomologist's Record." "The Naturalist." "Le Naturaliste Canadiene." "American Monthly Microscopical Journal," &c.

EXCHANGE.

Wanted, Busk's Catalogue, and pamphlets on Polyzoa.—J. Smith, 121, Bewsey Terrace, Warrington.

Wanted, living specimens of any of the Orb-weaving Spiders (Epeirides and Ulobonides), for which cash or good exchange will be given.—John Rhodes, Technical School, Accrington.

Duplicate Coleoptera.—Dorytomus vorax, Pt. oblongo-punctatus, Deporæiis betulæ, C. campestris, Rhizophagus bipustulatus, Pogonus luridipennis (2), S. cylindricum, Melanotus rufipes, Cleonus sulcirostris, Melandrya caraboides, &c. *Desiderata*, numerous.—F. W. Lambert, 70, St Giles, Oxford.

Duplicates.—Adippi (fine and long series), Cardamines, Alveolus, Fages, Lucina. Tithonus, Geryon, Edusa (males). *Desiderata*.—Blandina, Zonaria, and many others, (Fine and well set only.)—F. W. Lambert, 70, St. Giles, Oxford.

Coleoptera.—*Duplicates*: Phinus germanus, Cænopsis waltoni, Amalus scortillum, Phytobius 4-tuberculatus, Tachys bistriatus, Anthonomus rosinæ, Ochina hederæ, Dryophilus pusillus, Platytassus echinatus, Apion vernale, Scymnus mulsanta, S. hæmorrhoidalis, S. frontalis, Telephorus hæmorrhoidalis, Anthicus instabilis, &c. *Desiderata*: Offers of scarce and local Coleoptera.—A. Ford, Glen Mount, Braybrooke Road, Hastings.

Duplicate Lepidoptera.—D. caprophila,* E. venosata,* V. urticæ* (Manx), X. cerago,* X. silago,* P. pulchrina, P. iota, S. menthastri (larvæ and imagines), H. elutata, H. oculea, M. strigilis, L. pallens, L. impura, T. orbona. *Disiderata*: numerous.—H. Shortridge Clarke, Sulby Parsonage, Lezayre, Isle of Man.

Wanted.—The following numbers of *Knowledge*:—Nos. 188 and 190, vol. vii. (1885); Nos. 192, 194, 197, 199. 201, 204, and 206, vol. viii.—G. A. Lewcock, 5, Minet Gardens, Harlesden, N.W.

Preserved Larvæ.—*Duplicates*: Quercus, Urticæ, Jaccobæ, Caja, Bucephala, Lanestris, Carpini, Cœruleocephala Cossus, Porcellus, Atalanta, and Menthastri. *Desiderata*: Any of the clearwings Sponsa, Nupta, Promissa, Villica, Dominula, B. rubi, Plantaginis, Batis, and many others.—S. B. Chandley, Latchford Warrington.

19 SEP 94

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Some Curious Aquatic Larvæ. GEO. SWAINSON, F.L.S. Plates.

Sexual Distinction of Insects. C. W. DALE, F.E.S.

Extracts from "Sylva Sylvarum." A. E. HALL.

Sugaring Notes.

Habits of Larva and Parasites on Orthosia Upsilon. J. COLLINS.

Bibliography of British Spiders. Rev. F. O. PICKARD-CAMBRIDGE, M.A.

Early Man. JOSEPH SMITH, F.R.S.A., M.R.I.A. Plates.

Rhopalocera of the Isle of Man. H. SHORTRIDGE CLARKE, Esq.

Synonymic List of British Spiders. Rev. F. O. PICKARD-CAMBRIDGE, M.A.

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Crag Polyzoa. J. SMITH, F.L.S.

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Evolution of the Spider. LINNÆUS GREENING, F.L.S., M.R.I.A. 19 plates.

Bird Notes. PHILORNIS.

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Gossiping Notes on Coleoptera. By G. A. LEWCOCK, F.E.S.

Angling Notes. A Day on the River Gowy. W. H. J. JENKINS, Esq.

Microscopical Notes from Note Book.

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BRITISH NATURALIST.

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SENSE ORGANS.

BY HENRY LANGDALE, M.D.

In order that an animal may survive and reproduce its species it is necessary that its actions shall be properly adjusted to the conditions in the world around it. It must avoid danger, be attracted by food, be differently affected by light and darkness, and by heat and cold, and by various other conditions in its surroundings. That this adjustment shall be more perfect animals are provided with specially modified parts, known as sense organs. These organs receive and modify stimuli from without, and transmit them along nerves to the central nervous system; for example, certain minute areas on the skin of man are specially sensitive to heat, and the action of heat on these sensitive areas sets up a nervous current, which travels along a nerve until it reaches the spinal cord, or other portion of the central nervous system, and there encounters nerve cells. In these cells the nerve current undergoes certain modifications which result in its being transmitted, perhaps in an augmented form, to other nerves, and along them to certain muscles, causing them to contract. We have here, in fact, an example of reflex action, and it is due to this kind of action, more or less modified by the action of the higher nervous centres, that the immense number of movements in response to stimulation of the sense organs take place. Such a process occurs when we place our hands unexpectedly in hot water and involuntarily jerk them out again. Here we have information given by our sense organ, followed by the adjustment of our behaviour in accordance with that information.

Whether we take a simple example like this, or a more complex one, such as our action when our eyes show us some danger and we avoid it, the condition reduced to its simplest form is the same. Our sense organs receive an impression, they send a current along our nerves to our nervous centre, and thence currents are sent to our muscles, and certain movements result. It will be seen in dealing with the simplest animals that this intervention of a definite nervous centre is not essential. The nerve current may in them pass directly from the part stimulated to the contractile part, or even the part which receives the stimulus may combine in itself the function of sensation and contraction. It should be noted, however, in this connection that though in the highest animals most actions result from impulses originating in, or at least passing through, the nerve centres, nevertheless the contractile elements are sensitive to direct stimulation. It is a familiar fact that muscle can be made to contract by stimulation even when cut off from all nervous centres, so that muscle, although a specially contractile tissue, has not, even in the higher animals, quite lost its power of receiving and transmitting a stimulus.

The organs of touch, found scattered in great numbers all over the body, are affected by the coarser jars and vibrations of objects which come in contact with the skin. The organ of hearing also is affected by vibrations in the surrounding air, more delicate than, but in many respects allied to, the vibrations appreciated by the organs of touch. The organs of touch are certainly sensitive to the concussion caused by an explosion in the surrounding air, and this same concussion is recognized by our hearing as a loud noise. Thus tactile and auditory organs only differ in the degree of their sensitiveness. In the sensitiveness of the retina to light we have another example of the effect of vibrations; but vibrations of a very different kind to those of touch and sound. Organs of taste and smell are sensitive to the chemical effect of certain substances which come in contact with them. It will be noticed that here also the difference between the actions of these two organs is one of degree rather than of kind. Especially is this the case in aquatic animals, where smell is probably only a delicate form of taste, though often appreciated by distinct organs.

Let us now examine some of the lowest forms of animal life, and observe how far we may suppose that they are sensitive to these various forms of stimulation, and how far they are provided with special organs for their appreciation. The common Amœba is a small mass of nucleated protoplasm devoid of any special sense organs. Any part of this organism is capable of performing the functions of digestion, of respiration, of contraction, and of reproduction; and we must conclude that every part is as sensitive as any other part to the changes in the surroundings which would, by a higher animal, be appreciated by its sense organs. While watching it under the field of the microscope, we realize that it is throughout sensitive to touch, for any part of it which comes in contact with a foreign body either contracts, and draws away from it, or gradually closes round it and ingests it. If we warm the stage we find that its movements become more active, and we conclude that it is sensitive to heat. Whether it has the rudiments of any sense of hearing is less easily determined; but it will exhibit some sensitiveness to vibrations in the surrounding water, of which sound vibrations are only a special class. That it has a rudimentary sense of taste is seen by observing that it is differently affected by organic and inorganic bodies with which it comes in contact, more frequently ingesting the former than the latter. Smell, as already stated, being only, in aquatic animals, a more delicate form of taste, a power of recognizing a smaller quantity of a substance of a certain chemical nature, we must conclude that if Amœba has a rudimentary sense of taste it has also a rudimentary sense of smell. I am not aware that Amœba behaves in any special way in the presence of light, but on the analogy of the action of light on other low forms of life, we may assume that light does affect it; probably, at least, its vital processes are more active in light than in darkness. Here, then, we have a speck of protoplasm which, although it has no special sense organs or nervous system, shows evidence of reacting in a crude way to most of the forms of stimulation to which we react in virtue of our elaborate sense organs and nervous systems.

If we next examine some of ciliated Protozoa, not so simple as Amœba, but still unicellular, we can observe a distinct specialization of certain parts for sensory purposes, and also a specialization of other parts for motion. In the first place we note, what might also have been noted in some of the forms of Amœba, that the external layer of the body is distinctly differentiated from the inside, and so must be the part which is affected time after time by changes in the surroundings.

In Vorticella we are still dealing with a unicellular organism, but we can recognize that special functions are assigned to special parts of the animal. Instead of any part being capable of serving as a temporary mouth we have here a definite mouth. This mouth has become a necessity, for the ectosarc of Vorticella is, compared with that of Amœba, rigid. The bell of Vorticella is to a certain extent contractile, but there is a specially contractile element found in the stalk. This stalk is a hollow cylinder, on the inner wall of which, coiled spirally around it, is a thickened ridge of protoplasm. Though the wall of the stalk itself is not contractile, this ridge of protoplasm is highly so, and its contraction has the effect of throwing the stalk into a spiral, and drawing the bell down to its attachment. If any foreign body, too large to be taken into the mouth, or otherwise objectionable, comes in contact with the cilia around the mouth, we see the animal suddenly retracted by the contraction of this layer of protoplasm in the stalk. Here we have the rudiments of a tactile sense organ sending impulses to definite muscles such as we are familiar with in the higher animals. We cannot trace the course of the nerve current from the disc to the stalk, but we may assume that it runs along one track more readily than another, and that if this track were still more specialized we should recognize it as a rudimentary nerve. The presence of a definite mouth in Vorticella suggests that the power of distinguishing food from inorganic matter is specialized around this mouth; in other words that Vorticella has a somewhat specialized organ of taste.

Let us now examine a fairly simple multicellular animal. Hydra presents no special sense organ, unless the cells of the outer layer of the body and tentacles are to be regarded as tactile organs. A section of Hydra shows the body wall to consist of three layers. —an external layer, the ectoderm; a middle muscular layer, the mesoderm; and an inner digestive layer, the endoderm.

The cells found in the ectoderm give strength to the body wall, and being on the outside are exposed to changes in the environment; the deeper parts of these cells end in tail-like processes which run in the mesoderm, and their presence in the mesoderm gives to this layer its character as the muscular layer. The relation of the contractile part of these ectoderm cells to the sensitive part is thus closely analogous to the relation of the stalk to the body of Vorticella. In Hydra there are no definite nerves; the current of molecular disturbance must pass from the sensitive part to the motor part in the substance of the cell itself. A condition has been described in some of the Hydrozoa in which the connection between the sensitive and contractile part of the ectoderm cell is drawn out into a fine thread, which will, in fact, represent a primitive nerve. We only require the development of a nerve cell in the course of this nerve to reach the typical condition of sense organ, nerve, nerve cell, and muscle already referred to. These nerve cells soon present themselves as we ascend the scale of development. They are found in the Medusæ, in which in some form a mass of such cells occurs opposite each sense organ on the margin of the bell. They are found in connection with cells, evidently having tactile functions, in some of the echinoderms, and, in fact, are familiar to us as the little masses of nervous tissue known as ganglia, found in almost all animals, from the lowest worm to the vertebrates.

It is a familiar fact that light has a powerful influence on the processes of animal and vegetable life. Granted this effect of light, it will be seen that if at any part of an organism there were developed a little mass of tissue more sensitive to light than the general tissue of the organism, there would be the first suggestion of a special eye, and if this special bit of tissue proved of service to the animal the probability exists of its being further perfected by its descendants.

Such a specialized tissue is perhaps seen in the pigment spot found in so many of the Protozoa. In this class we can scarcely expect to find anything more elaborate than this, but if we pass on to multicellular animals we can trace up the progress from the simple pigment spot to the elaborate eye in an almost uninterrupted series. The same is true to a certain extent of auditory organs. From a condition in which the whole surface of the organism is equally sensitive to vibration we pass to one in which certain parts become more sensitive; sometimes rigid hairs are found in intimate relation with nerves, sometimes a sac containing fragments of calcareous matter —otoliths—is found, sometimes a combination of the two, but whatever form the organ takes we have the same essential features as in other sense organs, namely, a sensitive area to "multiply disturbances," a nervous system more or less developed to transmit these disturbances, and a contractile element to produce the necessary movements. With smell and taste we do not find any great elaboration of the sense organs as compared with sight and hearing, in fact, in the highest animals the condition is not so very far removed from the conditions in the lowest; in both cases all that is required is that a certain sensitive area should come in *direct* contact with substances having a certain chemical composition, and a rather simple improvement of the mechanism by which this is effected is all the change we see in the advance from the lowest to the highest forms. Our organs of smell and taste do not give us anything like such elaborate information about the surrounding world as do our organs of hearing and sight, so we can understand that their structure should be relatively simple.

We have seen that the most important elements of the mechanism by which actions result from external stimulation are :—

(1) A sensitive area.
(2) A nerve connecting this with a nervous centre.
(3) A nervous centre.
(4) A nerve joining this centre with a muscle.
(5) A muscle or simpler contractile element.

In the lower animals, although the action in response to stimuli is present, there is no differentiation of their structure, and any portion of the body is capable of taking the place of these five elements.

As we advance to higher forms, the first element appears as a special structure, and with it the fifth. The second, third, and fourth elements are still undifferentiated, and this condition we find in Vorticella or in Hydra. In higher forms still we find all the five represented. This condition appears in some of the lowest worms, and from this condition to that found in the highest animals the change is only in the degree of elaboration of these five elements. More especially does the elaboration of the nervous centre increase; in fact, it is by its development especially that there results that greater use of the sense organs, that greater power of appreciating conditions in the surroundings and re-acting properly to them, which distinguishes the higher from the lower forms of life.

AN ENTOMOLOGICAL VISIT TO THE CANARY ISLANDS.

BY G. MOREL-DEVILLE.

To make this paper in any way interesting, considering the very short period I remained in Canary, and the consequent little time at my disposal to collect and investigate the various forms of insect life abounding in that island, I am afraid I must touch upon other subjects besides "entomology." Indeed, if I confined myself exclusively to that interesting study a few lines would suffice to detail my experiences, in which case it would hardly be worth while to take up your space. However, it occurs to me that a general description of the country, with the various objects of interest it contains, might prove to a certain extent acceptable. I have acted upon this, but as far as possible I have confined myself to Natural History.

Entomology in the Canaries is attended with a very great amount of exertion, and he must be an enthusiast indeed who can run about all day under a temperature of 130° to 135°, not on smooth, grassy plains—that is bad enough—but over stubbly ground, strewn with huge boulders, up and down mountain slopes, covered thickly in places with that very unpleasant plant—especially when you have thin clothes on—the great cactus, various species of "Euphorbiæ" (amongst others the giant *E. Canariensis*), the milky juice of which stains your hands and garments, and which treacherously snaps off at the wrong moment if you attempt to catch hold in order to prevent a nasty fall. To add to these inconveniences, you are sometimes compelled to wade knee deep in lava cinders, slipping back two steps to each one forward, and at other times to crawl up smooth blocks of lava, as slippery as glass, with a solitary and rare fig-tree here and there to help you on; I think therefore it will be admitted that if the sport is interesting, the pursuit of it is particularly arduous. I must not forget to mention also that the country being very mountainous, and of volcanic origin, you come unexpectedly upon deep fissures, ravines and precipices, when in pursuit of an insect, to the imminent risk of your neck.

In general, I noticed that the large gardens which are to be found in the estates of the rich "hidalgos" in the mountains are the best hunting grounds, both for diurnal and nocturnal lepidoptera, especially the latter. The large butterfly, *Danais archippus* (*Boisduval*), delights in settling on the broad leaves of the bananas, abounding in all these fairy-like gardens. The banana, it may be mentioned, is largely grown in and exported from Canary, principally to Liverpool and London. *D. Archippus* is a rather difficult fellow to catch, especially when he settles on these leaves, as you have to creep underneath the tree and net him with a difficult upward stroke. He has a very powerful flight also, and if you once miss him, is off like a shot. One thing I particularly took note of, this insect almost invariably returns to the same spot. It was not very rare in the mountain gardens, but I only saw it once in the open country. Between 7.45 and 8.30 p.m. was undoubtedly the best time to get nocturnæ. My friend and myself used to sally out—we were staying at a place called Telde, up in the mountains at the time, —armed with a primitive Spanish lantern ("linterno" they call them), with one of the glass panes broken, and a very sickly-looking candle as the only light. Noctuæ abounded at this hour, but the variety was small. They consisted chiefly of various "plusiæ." *Deilephila Celerio*, and *D. livornica* were caught on the white larkspur, and most of the noctuæ also. In the day time the great place to find noctuæ in the gardens was under the banana leaves, left in the sun to dry.

The natives, amongst other things, make baskets and ropes out of the dried leaves. Owing, however, to the fearfully hot sun, the insects were very wild and their capture was a matter of great difficulty even in the early morning. We beat a great many out, but took only a very few of them. The larger ones were especially provoking. They came out with a whizz, and were off before a movement could be made to secure them. I missed the beautiful *Ophiodes tirrhæa* of the South of France and Algeria in this way, much to my disgust. *Pieris daplidice* was principally taken on the mountain sides; it was much commoner than "brassicæ," and almost as common as "rapæ." *Lycæna bœtica* was exceedingly difficult to capture. In its rapid and uncertain flight its blueish-grey tint fitted in with the dazzling light of the sun and the grey crumbling ground, and it was well nigh impossible to capture, more especially as it was generally abundant on mountain sides almost as steep as the side of a house, where pursuit was an absolute impossibility. *Polyommatus phlœas* abounded, as did *Colias edusa* in certain places. The former is a rather finer insect than with us, being larger and darker, and I fancy also that what I shall unscientifically call the tail, is somewhat more accentuated than with our British species. I captured a very small *C. edusa* in a valley by itself, and did not see a single other specimen anywhere in the neighbourhood, which struck me as being rather curious. *Satyrus janira*, which is somewhat different to ours, I only saw in one locality, but there it was abundant. *Satyrus ægeria*, the underside of which is slightly different to ours, was principally found in the gardens. *Deiopeia pulchella* I found resting on a rock, surrounded by the sea, one day when I was out bathing. Regarding the *Geometræ*, their scarcity was really remarkable. My friend took, I think, two small *Acidalia*. He also took one or two of the Micro lepidoptera, which were also very scarce. In addition to the species I have mentioned, we saw, but failed to catch, *Macroglossa stellatarum*; a clearwing with which I was unacquainted, and many noctuæ, which, as I previously mentioned, had so rapid a flight that we were only able to guess at their colouring and form.

My friend, I may also mention, captured *Vanessa atalanta*, which differed in no way from our own specimens. Taking one thing with another, my collection of lepidoptera was not as good as I hoped it would be, but it must be borne in mind that we were only there ten days, that it was one of the driest times of the year, that we were only able to visit one side and only part of the interior of the island, that we were totally ignorant of the habits of the Canary lepidoptera, and totally ignorant, also, of the best places to visit. Before quitting the lepidoptera, I would like to mention that the only larvæ we found were half-a-dozen of the noctuæ on the maidenhair, which we were unable to rear, and one large (noctuæ), which I picked up in a dusty road, and which died on the homeward voyage. It was very ungrateful of it to do so, as I had taken the trouble of bringing away with me a lot of groundsel to feed it on, but the motion of the ship evidently affected its digestive organs.

The grasshopper tribe was extraordinarily numerous. They perfectly swarmed in places, and the higher one got up the mountains the more there seemed to be of them. They took flight from under our feet in perfect clouds in certain places, and the flight of the larger specimens is extremely rapid though not long sustained. Of the neuroptera we took several fine varieties, but their colours are very evanescent. Regarding the coleoptera, I collected a bottle full for a friend ; they were chiefly remarkable for being of a universal black colour. I took about 15 different kinds.

Grand Canary is the largest of a group of seven islands belonging to Spain. Its capital, Las Palmas, is not a paradise, being ill paved and worse drained. There are, however, some very good hotels about a mile from the capital, the best of which is the Hotel Metropole. The houses in Canary are mostly flat-roofed—as in the East. In the centre of the building there is generally a "patio," or square courtyard, surrounded with foliage, flowers, and comfortable cane chairs. Fountains sometimes play among the foliage. A house, dingy and dirty in outward appearance, is thus often transformed into a miniature Eden when once you have passed the threshold.

The dress of the people, especially that of the women, is very picturesque, and a group of Canary women and girls round one of their primitive wells, with earthenware pitchers on their heads, is a very interesting sight. The picturesque features of the men lie in a somewhat bloodthirsty apppearance, which the black cloak and black sombrero tend to accentuate. The scenery is in many places very grand. The mountain slopes are mostly barren and uncultivated, almost the only plants found on them are the cactus and various species of "euphorbiæ." In the "barrancos," or valleys, however, charming villages nestle in a bed of verdure. Palms, yams, tomatoes, bananas, sweet potatoes, Indian corn, etc., etc., flourish and make the sight a very attractive one, while the contrast to the black heights above them is startling. The cochineal industry is, of course, most interesting, but as it has been fully treated by several writers, it is useless for me to say anything about it. In a valley at a place called San Mateo we found arum lilies growing wild. The maidenhair is extremely common in the most humid, as in the most barren spots. Many other ferns flourish in the valleys, such as the woodseers, adiantum nigrum, etc. The red geranium is also very abundant, and is made to grow in hedges, as blackthorn in England. Timber is, comparatively speaking, rare. Fig trees are, I think, the commonest trees to be seen there; there are also pepper trees, eucalyptus, fir, and poplar. In the gardens occasional very fine timber is to be seen; coffee trees, orange, lemon, magnolia, tallow, bread fruit, etc., abound. I must not forget to mention the famous dragon tree, indigenous to these islands. As regards wild birds, we noticed green canaries in great numbers, blackcaps, hoopoes (*Upupa epops*), blackbirds, several species of vultures and eagles, ravens, crows, and several very pretty small birds, which were unknown to me. Lizards of all sizes, from a couple of inches to a foot and a half in length, and of all colours, were extremely abundant, and very beautiful some of them were. Altogether the Canaries are a delightful place to spend a holiday in; they are easy of access, and I can heartily recommend them to brother entomologists.

Amongst the insects captured may be mentioned the following :—

Danais archippus.
Satyrus acgeria.
Satyrus janira.
Vanessa cardui.
Syrichtus —
Pieris daplidice.
Colias edusa.
Polyommatus phlœas.
Lycæna bætica.
Lycæna medon.
Deilephila celerio.
D. livornica.
Plusia —
Plusia —
Plusia —
Agrotis saucia
Agrotis and exclamationis.
Agrotis —
Heliothis armigera.
Deiopeia pulchella.
Several species of Orthoptera and Diptera.

THE SEXUAL DISTINCTION OF INSECTS.

BY C. W. DALE.

I.—Disparity of Colour—(*continued from page 164*).

In Coleoptera, colour does not play an important part between the sexes. The nearest approach to complete unlikeness is apparently presented by Osphya bipunctata, in which the male is black, with the edge of the thorax, the base of the antennæ, and the legs (mostly) reddish; while the female is yellowish brown, with the top of the head, two spots on the thorax, and the tip of the elytra black. The male of the Metœcus paradoxus has the elytra almost entirely yellow, while in the female they are nearly or quite black. The male of Campylus linearis has the elytra pale yellow, with or without a dark suture; the female has them black, with a yellow outer border. Tillus elongatus and Cryptocephalus coryli have the thorax black in the male, bright red in the female. The elytra of the male Apion lævigatum are black, those of the female deep violet; those of Apion sorbi are brassy black in the male, and greenish blue in the female. In some of the Harpali, the male is of a shining blue, green, or blue black, while the female is dull black. The male of Donacia affinis is black with a violet reflection, the female is bronze or brassy. The male of Scymnus discoideus has a reddish yellow head and thorax; the female is entirely black. The male of Cryptocephalus bilineatus has a yellow head, with a black line down the middle; the female has a black head, with two yellow spots between the eye. The male of Apion difforme has the antennæ entirely yellow brown; the female has the antennæ entirely black. The male of Apoderus coryli has a black head; the female a red head.

II.—Disparity in Size.

The butterflies exhibit a certain amount of disparity in the magnitude of the sexes, and the females have the advantage; but it is only necessary to arrange a series of any species by the size of the individuals, and it will become very evident to those who can readily distinguish the sexes that the thirty smaller individuals are by no means invariably males, nor the thirty large ones females, but the males and females alternate with something approaching to regularity. The largest and most familiar groups of moths are the Sphinges, the Bombyces, the Noctuæ, and the Geometræ.

Beginning with the Bombyces, we find the males larger in Ino, Setina, Euchelia, Euthemonia, and Nemeophila; the females in Hepialus, Endromis, Saturnia, Lasiocampa, Odonestis, Bombyx, Dasychira, and Liparis; the sexes alike in Lithosia, Callimorpha, Arctia, Spilosoma, Cerura, and Notodonta. In the Noctuæ the males are larger in Acosmetia, Hydrilla, Stilbia, and Miana arcuosa; on the other hand the females of Nonagria typhæ and lutosa have that advantage, and yet these three last are surrounded by closely allied species in which no such difference obtains. In the Geometræ the males are larger in Scodiona, Selidosema, Acidalia, Oporabia, Eubolia cervinata, Mesotype lineolata, and Larentia multistrigaria; but these are the exceptions; in an overwhelming majority there is no disparity in size, and the same may be said of all the groups of the Lepidoptera. In the Pyralides the males are the larger in Cledeobia, Pyrausta, Platytes, and Scopula alpinalis; the females are the larger in Cataclysta, Hydrocampa, Schœnobius, and Aphomia. In the Tortrices the males are the larger in Peronea aspersana, Peronea mixtana, and Sphaloptera ictericana, the females are the larger in Tortrix and Olindia. In the Tineæ, the males are the larger in Epigraphia, Adela, and Pleurota; the females are the larger in Hyponomenta, Orthotelia, and Depressaria.

I have purposely avoided bringing in species with apterous or semi-apterous females, as they will come into another division, and their bodies are of about the same size as the males.

In the Coleoptera the males are the larger in Lucanus, Dorcus, Sinodendron, Dytiscus, and Acilius; the females are the larger in Prionus, Aromia, Lymexylon, Meloe, and Adimonia.

In the Hymenoptera there is a vast difference in size in the sexes of some of the ants; the males of Formica nigra, aliena, flava, and umbrata not being half as large as the females; the neuters of the ants are wingless and of smaller size than either the male or female.

The males of bees and wasps are as a rule smaller than the females; however, those of this mellifica and Anthidium manicatum are larger.

In the Diptera the males are the larger in Tipula plumbea, T. nigra, T. lunata, Pachyrrhina annulicarnis, Pedicia rivosa, Limnophila bicolor, and Idioptera pulchella; the females are the larger in Tipula gigantea, T. lutescens, and Symplecta punctipennis.

In Trichoptera the male of Phryganea grandis is much larger than the female. In Homoptera the female of the American Blight, Schizoneura lanigera, is more than twice the size of the male.

III.—Disparity of Form.

The males of Lobophora hexapterata and L. sexalata have a wing-like lobe at the base of the hind wings, giving them the appearance of being six-winged. The male of Eucosmia undulata has an appendage at the base of the hind wings, somewhat resembling a brush. The male of Colias edusa has a kind of glandular sac placed upon the anterior edge of the hind wings near the base.

The males of Dytiscus and Acillius, genera of the Coleoptera, have smooth, the females rough, elytra. Amongst the Orthoptera, the males may be distinguished from the females, in Decticus, Phasgoneura, Platycleis, and Xiphidium by a transparent eyelet at the base of the fore wings.

In Hymenoptera the male of Ceiocephala has the head curiously tricornuted, and the females of Cratonius have the heads of a very large size, but in Lyda both sexes have large heads.

Females with very short or no wings.—Most of the moths which emerge in late autumn, winter, or early spring have wingless or very short-winged females. These are Hybernia progemmaria, H. aurantiaria, H. leucophæaria, H. rupicapraria, H. defoliaria, Anisopteryx æscularia, Nyssia zonaria, N. hispidaria, Phigalia pilosaria, Cheimatobia boreata, C. brumata, Diurnæa fagella, Exapate gelatella, Lemnatophila phryganella, and Dasystoma salicella. The females of Orgyia antiqua and O. gonostigma, and the genera

Fumea, Talæporia, and Solenobia are also wingless; as is also the female of Acentropus latipennis.

In Trichoptera the female of the terrestrial Enoicyla pusilla is wingless.

In Diptera the females of Tipula pagana and Clunio marinus have short undeveloped wings.

In Coleoptera, the females of Drilus flavescens and Lampyris noctiluca are entirely without elytra or wings.

In Orthoptera the females of Blatta are wingless.

In Hymenoptera we find many wingless females, especially amongst certain genera of the Ichneumonidæ, as Pezomachus and allies, in the Chalcididæ, Proctrotrupidæ, and Mutillidæ; whilst the neuters of all the Heterogyna or ants are also wingless. The neuters of the ants are also much smaller than the males and females, and of different colour. The sexes of Myrmosa and Methoca are entirely different in form and colour, whilst the sexes of Mutilla closely resemble each other in these respects. Indeed those of Methoca are so different that Latreille described them as different genera and species, the male under the names of Tengyria sanvitale, the female under the names of Methoca ichneumonides, placing them far asunder.

Both sexes of Pezomachus gracilis and others are wingless, but the males of P. acarorum, P. costatus, and a few others have fully developed wings.

In the Proctrotrupidæ, the red wingless Myrmecomorphus rufescens is now considered to be the female of the black winged Embolemus ruddii, and the wingless Oxylabris brachyptera to be the female of the winged Oxylabris erythropyga.

In the Chalcididæ the males of Eupelmus degeeri, Eucyrtus hemipterus, and Eucyrtus lindus are winged, and the females wingless.

Now we come to the order Hemiptera. In it we find a great difference between the sexes of the genera Microphysa and Myrmedobia; the males have fully developed wings, the females are wingless. A good many species of this order have the wings undeveloped in both sexes, but occasionally they are developed.

In Homoptera the females of the curious genus Dorthesia are wingless, as are many females of the Aphides. In Delphax and a few other genera the wings are often undeveloped in both sexes.

The females of Coccus, a genus of the Homoptera, are also without wings. The males are fully developed, with tails like a May Fly, and of a white colour.

Females without either wings or legs.—The females of Psyche, a genus of the Lepidoptera, are yellow grub-looking creatures with neither wings, legs, nor antennæ, never emerging from the case. The black males are fully developed, and are most active creatures.

The females of the Strepsiptera or Stylopidæ are also without wings, legs, or antennæ, and never leave the tail of the bee in which they are bred. The males, on the other hand, are fully developed and fly about.

Males with very short wings.—In all the instances I have mentioned, the males have fully developed wings. The only cases to the contrary that I know of, exceptions to the general rule, are those of the Chalcial —Melitobia retusa; and of Perla, a genus of the Neuroptera. In the latter genus especially, the males have short wings, whilst the females have them large and fully developed.

PART II.—Synonymic List of the GENERA of the British ARANEIDEA.

BY THE REV. F. O. PICKARD-CAMBRIDGE, M.A.

(Continued from page 215.)

FAMS.:	SUB FAMS.	GENERA.	PUBLICATION.
Araneæ Veræ Ecribellatæ.			
Attidæ *(Continued.)*			
		PELLENES, *SIM. 1876.*	
		Pellenes,—*Cambr. 1889.*	P.D.N.H.S., x., p. 122.
		,, ,—*Sim. 1876.*	Ar. Fr., vol. iii. p. 90.
		ATTUS, *WALCK. 1805.*	
		Salticus,—*Blackw. 1861*, in pt.	Spid. Gt. Bt. Ir., p. 49.
		,, ,—*Cambr. 1863. 1870.*	Zoologist, T.L.S., xxviii., p. 528.
		Yllenus,— ,, *1874*, in pt.	T.L.S., xxx., p. 334.
		Attus,— ,, *1879-31.*	Spid. Dor., vol. ii., p. 407.
		,, ,—*Sim. 1876.*	Ar. Fr., vol. iii., p. 101.
		PHLEGRA, *SIM. 1876.*	
		Salticus,—*Cambr. 1862.*	Zoologist, 1862, p. 7945.
		Ælurops,— ,, *1874.*	T.L.S., xxx., p. 333.
		Attus,— ,, *1875.*	A.M.H.H., 4, xvi., p. 258.
		Phlegra,— ,, *1879-81.*	Spid. Dor., vol. ii., p. 414.
		,, ,—*Sim. 1876.*	Ar. Fr., vol. iii., p. 120.

FAMS.: SUB. FAMS.

Araneæ Veræ Ecribellatæ.

Attidæ.

(*Continued.*)

GENERA.	PUBLICATION.
ÆLURILLUS, *Sim. 1885.*	
Salticus, *Cambr. 1862.* in part,	Zoologist, 1862, p. 7945.
Yllenus, ,, *1874.* ,,	T.L.S., xxx., p. 334.
Ælurops, ,, *1879-81.*	Spid. Dor., vol. iii., p. 415.
,, , *Sim, 1876.*	Ar. Fr., vol. iii., p. 134.
HELIOPHANUS, *C. Koch. 1833.*	
Salticus,—*Blackw. 1861.* in pt.	Spid. Gt. Bt. Ir., p. 57.
,, ,—*Cambr.* ,,	T.L.S. xxvii. p. 403.
Heliophanus,—*Camb. 1879-81.*	Spid. Dor. vol. ii., p. 394.
,, , *Sim. 1876.*	Ar. Fr., vol. iii., p. 140.
EUOPHRYS, *C. Koch. 1834.*	
Salticus,—*Blackw. 1861.* in pt.	Spid. Gt. Bt., Ir., p. 52.
,, ,—*Cambr. 1863.* ,,	Zoologist, T.L.S. xxvii. p. 400.
Euophrys,—*Cambr. 1879-81.*	Spid. Dor., vol. ii., p. 402.
,, , *Sim. 1876.*	Ar. Fr. vol. iii., p. 170.
BALLUS, *C. Koch. 1850.*	
Salticus,—*Blackw. 1861.* in pt.	Spid. Gt. Bt. Ir., p. 53.
Ballus,—*Cambr. 1879-31.*	Spid. Dor., vol. ii., p. 399.
,, ,—*Sim. 1876.*	Ar. Fr., vol. iii., p. 201.
NEON, *Sim. 1876.*	
Salticus,—*Blackw. 1861.* in pt.	Spid. Gt. Bt. Ir., p. 60.
Euophrys,—*Cambr. 1874.*	T.L.S., xxx., p. 333.
Neon,—*Cambr. 1879-81.*	Spid. Dor., vol. ii., p. 401.
,, ,—*Sim. 1876.*	Ar. Fr., vol. iii., p. 208.

There are further sub-divisions in addition to those created by M. Simon, which will at a future time be adopted in the classification of the Family *Theridiidæ.* Some of them have already been instituted by Prof. Kulczynski, Dahl, Menge, and others, and published; but I do not think it advisable to insert them in the present publication, We are probably some way off yet from the end of the sub-division of the spiders of this large and difficult family.

(*To be continued.*)

REPORTS OF SOCIETIES.

THE SOUTH LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY.

13th September, 1894, E. Step, Esq., President, in the chair.

Mr. R. Adkin exhibited, on behalf of Mr. South, all the named forms except v. *albana* of *Peronea variegana*, Schiff.; on behalf of Mr. Murray, of Carnforth, a beautifully bleached var. of *Erebia æthiops* Esp., from his neighbourhood; on behalf of Mr. W. F. de V. Kane, a pale grey var. of *Agrotis segetum*, from N. Ireland; also on behalf of himself, a branch of the rare star thistle, Centaurea (*Centaurea calcitrapa*, L.), from Eastbourne; and a short series of *Arctia caja*, L., bred this year, with notes on the variation shown by them.

Mr. C. G. Barrett, the specimen of *Plusia moneta*, Fb., taken at Norwich by Mr. Tillett; and a beautiful red var. of *Oncocera ahenella*, Zinc., taken at Folkestone, by Mr. Purdey.

Mr. Filer, series of *Epinephele hyperanthes*, L., from Brockenhurst and Halstead, showing local variation.

Mr. H. Moore, male and female living specimens of the Orthopteron *Ephippigera vitium*, from Poictiers, and read notes as to their habits; he also contributed his observations upon Lepidoptera in France during August.

Mr. A. Hall, a splendid var. of *Pyrameis myrinna*, from Bogota, S. America, with the type form for comparison.

Mr. Dennis, a specimen of the "Silver Fish," *Lepisma saccharina*.

Mr. Manger, a specimen of the rare Stalk-eyed Crustacean, *Gonoplex angulata*, which had been dredged off Weymouth.

Mr. Step, several specimens of *Polyporus perrennis*, from Oxshot.

Mr. Perks, a fungus of the genus *Tubercularia*.

Mr. C. G. Barrett, photographs of the entomologists who recently met at Mr. Capper's house in Liverpool.

Mr. Tutt gave a lengthy and interesting account of what Dr. Chapman and himself had observed during a tour through France, Switzerland, and N. Italy, especially referring to those species of Rhopalocera which occur in Great Britain. A discussion ensued, and Mr. Mansbridge gave a few remarks upon Lepidoptera in the Indian territory, U.S.A.

Mr. West, of Greenwich, a specimen of the rare Coleopteron, *Lebia cyanocephala*, L., from Bookham, with specimens of the two races of *L. chlorocephala*, Hoff., for comparison.

27th September, F. Step, Esq., President, in the chair.

Mr. Auld exhibited a larva of *Phorodesma smaragdaria*, Fb., which had been feeding fourteen months.

Mr. Jäger exhibited the series of *Callimorpha hera*, L., taken by him in S. Devon this year, while accompanied by Messrs. H. Robson and G. T. Porritt. The red, yellow, and terra-cotta forms were all represented.

Mr. Winkley, two specimens of a second brood of *Smerinthus populi*, L., bred this year; also four clutches of young of the mollusc, *Helix pomatia*, L., which had recently hatched.

Mr. Filer, long series of bred *Papilio machaon*, L., from Cambridge, one specimen having the marginal band of the hind wing extended so as to unite with the discoidal spot.

Mr. H. Moore, a specimen of *Vanessa urticæ*, L., from Vienna, having the two spots only represented by a few dark scales.

Mr. Williams, a specimen of the intestinal worm, *Gordius aquaticus*, which had emerged from the body of a water spider.

Mr. A. Hall, about twenty species of Rhopalocera from Japan, identical, or almost indentical, with British species, including *Papilio Machaon*, L., *Leucophasia sinapis*, L., *Gonopteryx rhamni*, L., &c.

Mr. T. W. Hall, a long series of *Melanippe fluctuata*, L., from Perth, one being ochreous, many dark, and several were var. *neapolisata*.

Mr. Adkin, *Zygæna exulans*, Hoch., from Braemar; *Sesia scoliiformis*, Bork., from Rannoch; light and dark forms of *Abraxas grossulariata*, L., and grey forms of *Melanippe fluctuata*, L., from Aberdeen; and on behalf of Mr. R. A. Adkin, the following mollusca from Eastbourne: *Helix aspersa*, Müll., *H. ericetorum*, Müll., an unusually large *H. virgata*, Da Cos., and *H. caperata*, Mont., the three former species having abnormally high spires.

Mr. Perks, a photograph of the Fox Shark (*Alopecias vulpes*), recently captured off the Devon coast.

Mr. West (Greenwich), on behalf of Mr. Tugwell, a large number of *Zygæna exulans*, Hoch., taken this year at Braemar, with cocoons *in situ* on Crowberry.

Mr. Tutt made some very interesting remarks on the different climatal conditions which the same species of Lepidoptera experienced in the High Alps and in our own country, and noted various modifications of habits resulting therefrom.—HY. J. TURNER, Hon. Report Secretary.

THE DEVELOPMENT OF SOCIAL INSTINCTS.

BY A. J. JOLLEY.

It may plausibly be urged that a definition of social instincts must precede any profitable discussion of their development. No one, however, who has given any serious attention to mental phenomena will dispute that against such a plausible objection must be set the impossibility of defining with accuracy, precision and completeness any of the instincts of any species of animal.

It would seem not unfair to group as social instincts any of those mental habits or tendencies which, consciously or unconsciously, at whatever cost to individuals, foster sociality within a species. But just as individuals necessarily precede those groups of individuals which we call societies, so those higher instincts which we call social have been preceded by others, and a discussion of the development of social instincts must take account of those earlier forms of consciousness or sub-consciousness out of which social instincts have arisen.

Mere aggregations of individuals do not necessarily constitute societies, though such aggregations may form one of the kinds of raw material out of which natural selection can manufacture societies properly so called.

Again, a family does not properly constitute a society, though the family also may give rise to a larger group, and the instincts which foster the preservation of such a larger group may properly be called social, though their origin and development can only be understood by those who remember that they were at first of narrower range, perhaps purely sexual.

Since instinct is a form of consciousness—otherwise there is no distinction between it and reflex action—and since we cannot describe consciousness in terms of a plant's functions, to speak of the social instincts of plants is to use words without meaning. To describe an oak-forest as a society of oak trees would also be an abuse of language, nor could such an aggregation of plant units ever give rise to any instinct, social or otherwise.

Amongst animals of very low organization it is by no means unusual for large numbers to be found occupying relatively small areas; but such aggregations have no better claim to be deemed societies than has an oak-forest or a wheat-field; nor could it be said that such aggregations needed study, were it not that they help to show one of the ways in which societies originated, and that in the sub-conscious manifestations of the diffused nervous systems of their units we may detect the dawning of some social instincts.

Without division of labour no complex or highly developed society can exist, and division of labour begins amongst very lowly animals; yet, though many of the colonial Hydrozoa exhibit this elementary social feature, none of them can properly be classed as social organisms.

It is only amongst Arthropods and Vertebrates that true sociality appears, and even in these two sub-kingdoms it is neither so common nor so widespread as is sometimes supposed. Despite the enormous number and variety of animals included in the Arthropod group, sociality has only arisen in one class of them, the Insects, and in but a few species of two orders within that class. Of these the oldest are the so-called "white ants" belonging to a family (Termitidæ) of high antiquity, which already existed in the coal age, and whose species still flourish in most tropical and sub-tropical regions. Many of the Termite species build nests 10 or 15 feet in height, and of elaborate internal arrangement; whilst among the inhabitants of the nest there is considerable diversity of structure and function, and an organization to which the name social cannot reasonably be refused. Amongst higher and, geologically speaking, more modern insects the Hymenoptera supply numerous instances of sociality. From very early times ants and bees have been regarded as models of what men should be, and moralists from King Solomon to Dr. Watts have not hesitated to stimulate the evil passions of unregenerate humanity by ill-timed references to the forethought of the ant and the industry of the bee.

Though some species of both ants, bees, and wasps are commonly spoken of as social, it must not be forgotten that other and more primitive species of these groups are solitary, and that in its stricter sense the adjective social is applicable to some species of ants only; the communities of social bees and wasps being, despite the diversities of structure and function which obtain within them, only large families, the descendants of one female. Nevertheless, except by an arbitrary limitation of the meaning of the term, it is impossible to deny that social instincts are possessed by many ants, bees, and wasps; storage of food, care of young, the construction of elaborate dwellings (nests or burrows); the capture and breeding of aphides by ants, in order to secure the honey-dew from them, all prove the possession by these animals of instincts which tend to foster sociality within the species.

Passing to the vertebrate sub-kingdom, we find that true sociality here, as amongst Arthropods, is restricted to the higher groups, and is by no means universal, even in those higher groups. Favourable conditions, either in the surrounding medium or of food supply, may lead to the aggregation of enormous numbers in a limited space, but few only of such aggregations develop into social groups. Sexual attraction may lead to temporary companionship; but neither amongst fishes nor batrachians, which constitute the lowest and represent the ancestral types of vertebrate animals, do we find any trace of social organization. At a higher level, amongst the reptiles, we still fail to detect anything which can properly be called sociality; hibernating snakes are often found in curious bundles; turtles, at the breeding season, occur plentifully in particular localities; but these phenomena are due to external conditions, and are in no sense social. Even in the upper division of the Sauropsidan class, amongst the birds which have arisen from the lower reptilian group, sociality is the exception rather than the rule. Love of mates and of offspring is usually highly developed, but sexual jealousy and the prolonged companionship of mates has fostered family and individual at the expense of social development. In some species, however, aggregations, perhaps originally due solely to favourable conditions of environment, proved to be of defensive value, and have developed into societies, whose members, though they may have frequent quarrels amongst themselves, yet will unite against a common enemy, and carry on much of their life-work in harmonious co-operation. The common rook is a familiar example of a social bird. The dwellers in a rookery fight amongst themselves, and rob one another without scruple; but they will speedily unite to drive away any feathered foe. They usually feed together, and if surprised or endangered during their repast the whole flock take to flight. They seem to have some rudimentary notions of justice and of social organization, though I should certainly not urge as evidence of the latter that the flock, before alighting in a field, post one as sentry on a tree, from which he can command a good view and warn his comrades of any approaching peril. I have often watched rooks feeding, and it is certainly rare for the whole of a flock to alight on the ground, some almost invariably taking up a position in one or more adjacent trees. But there are frequent changes, some flying up from the ground to the tree, and *vice versâ ;* and to call this " posting sentinels " is mere anthropomorphism.

The transition from mere crowding in a suitable environment to true sociality is well illustrated amongst the tropical weaver-birds. Most of the numerous species of this family build, or rather weave, hanging nests, which are entered either from the side or from below, and afford shelters admirably protected against the attacks of small monkeys or arboreal reptiles. Some of the species seem to prefer nesting in groups, one tree holding several nests, whilst another—apparently equally suitable—has none ; in this, these species resemble our own rooks, nor is it difficult to see that the habit may be beneficial to them in various ways ; but the tendency reaches its climax, and a much higher level of sociality than appears elsewhere in the weaver-bird family is attained by the South African *Philhetærus socius*, sometimes called the Social Grosbeak. A number of these birds unite together, select a tree—usually one with a smooth and not easily climbable stem—collect coarse grass, and with it weave a roof which is supported by the trunk and branches of the tree. Having completed their common protection, under and suspended from this roof each pair builds its own nest, and communities of more than 100 pairs have been found whose social organization is little below that of the human inhabitants of the same region. Joint action for the benefit of the community is also seen amongst the Australian bush-turkeys (*Talegallus*), which live in small flocks and construct a common mound of earth and decayed leaves in which the hens deposit their eggs.

Whether the flocking which usually precedes the migrations of birds can be described as due to a social instinct depends on the limitations of meaning assigned to the adjective. If a liberal interpretation be allowed, it may be said that the instinct is at least rudimentarily social ; very few birds migrate except in flocks, when the personal experience of the older probably plays at least as important a part as the hereditary tendencies of the younger birds in directing the course of the journey ; and that natural selection, by the elimination of those individuals which being either above or below the general level of intelligence become stragglers, tends to preserve the rudimentary and temporary sociality there can be no doubt ; the evidence of numerous observers both at sea and along various coastlines proves that many bird-stragglers meet a watery death, and others fall victims to enemies or to the weather, dangers which they would have escaped had they flocked with their comrades.

Amongst the Mammals we find that in the most primitive group, whose intelligence as well as the general pitch of their life is of a very low order, no trace of sociality appears. None of the few known species live other than solitary lives, but in the next group, the Marsupials, of which the American opossums and the Australian kangaroos are the best known representatives, some approximations to sociality appear. In the early days of the Australian colonies, the plains were inhabited by numerous herds of several species of kangaroos, which have since been largely replaced by herbivorous animals more profitable to man. The potoroos—animals closely allied to the true kangaroos, and similar in size to our rabbits—like the latter, live in burrows, of which a considerable number are usually found together; as is also the case with the bandicoots, which externally resemble large rats and feed on insects and small animals. The squirrel Flying-Phalanger (*Belideus sciureus*), one of the fruit-eating Marsupials, also lives socially in the forests of Australia, though with this, as with the previously mentioned species, the social instincts are of a quite rudimentary character, and we see rather collections of individuals due to special suitability of locality or to plentifulness of food supply than properly social groups.

(To be continued.)

A VISIT TO THE BRITISH ASSOCIATION.

BY GEO. SWAINSON, F.L.S.

The ancient city of Oxford has done itself honour by giving a very hearty reception to the British Association. Though the local members joining have not been so numerous as was the case in the recent meetings in Manchester and Birmingham, yet the attractions of this venerable seat of learning are so potent that the numbers have certainly been above the average, and I have been much struck with the large contingent of lady members, who not only flocked to the receptions, garden parties and excursions, but have even found their way to such occult sections as the mathematical, the mechanical, and the economical, in surprising numbers; while in their favourite geographical and anthropological sections they certainly formed the majority of the audience. We see less of the antiquated blue stocking and more of the refined features of England's daughters, while the bright young faces seen on every hand prove that an outing to the British Association meeting is now looked forward to by many as a time of pleasure, to be preferred even to the breezes from the ocean at Southport or Scarborough. The college gardens are now at their best, and as the blue or green ticket of the Association is an "open sesame" in every direction, they have been constantly visited.

The address of our "Most Noble President," the Marquis of Salisbury, has, through the medium of the press, become the property of all. The portly figure, in its black and gold academic dress, and the fine resonant voice will long live in our memory. The address itself was a wise, witty, and very able deliverance from a literary point of view, though, no doubt, most disappointing to a pure scientist. But its wisdom in the peculiar circumstances of this meeting was apparent on Sunday last from many a pulpit, from the Bishop of Oxford downwards. Oh, how it soothed the *amour propre* of the clerical dons for the scientists to be told how little they really knew, and how vast were the profound depths of the ocean around them, where, like Sir Isaac Newton of old, they could only play with the pebbles on the shore or throw in their tiny plumb-lines of thought and investigation!

The great change which has come over the mutually antagonistic elements of science and divinity of 30 years ago was very apparent. It was, however, the greatest treat to see the venerated form of Professor Huxley once more rise to speak in a meeting of the Association, as with some of his old martial spirit, and with a clear sounding voice, did he fasten upon the handsome admission of the Marquis that the doctrine of evolution had killed the old theory of the immutability of species and genera. One could not help but remember that 34 years ago, in this very Oxford, was England's grandest savant, Charles Darwin, regularly badgered by the clerical bigots of that age, who styled the leading scientists as "the hotch-potch of philosophers." How very different must the feelings of Professor Huxley have been! Here in broken tones he expressed his deep appreciation of the kind and sympathetic words of the President, acknowledging the debt of gratitude that science world-wide owed to the author of the "Origin of Species." How different to the clashing of arms and the scintillations of hot yet brilliant repartee at Oxford's last meeting, and how far down the ocean swell must have gone since that time of stress and storm when Huxley, defending his old friend, stridently told the Bishop of Oxford to his face that he would rather own his descent from an intelligent baboon than from bigoted ancestors of the type he had met with recently.

The addresses of the presidents of the various sections on the following day were most erudite, and made up in full bodied flavour of scientific dicta whatever might be lacking in Lord Salisbury's opening address. I was fortunate, perhaps, in selecting my favourite section D, for there was delivered an exceptional address by Professor Bayley Balfour on the interesting and intelligent topic of forestry, showing how much in advance of us are the Continental states on scientific tree growing. The great need for landowners turning their attention to this matter, now that much land was so unremunerative, was proved by the fact that we in Britain were within measurable distance of a timber famine, that Swedish and Russian forests were becoming exhausted, and that the Forest Department of the United States asserts that their supply could not last more than 100 years unless steps are taken to meet the difficulty boldly.

Sir William Flower, of the British Museum, had a grand audience in the Sheldonian Theatre to listen to his exposition of the present position of anthropological science. But perhaps the most interesting methods for enlightening now adopted by the Association are the discussions held between two somewhat antagonistic sections. For instance, I recollect in recent years those on coral islands and the age of coral rocks, and in the year before a very interesting discussion between the botanists and zoologists as to whether some low forms of life (euglena, volvox globator, &c.) were plants or animals. Well, we have had two or three such discussions. I was able to attend the one between sections C and E, where the geologists on the one hand, and the anthropologists on the other, argued the always interesting topic of "The Antiquity of Man." Section E fought bravely for the human making and fashioning of the various arrow-heads, hammers, and tools of flint which have been found under the gravels left at the glacial epoch, and had the support of such eminent authorities as Professor Boyd Dawkins and Sir John Evans, while the geologists supplied the destructive criticism to many of the theories.

One thing comes out more clearly year by year—that it is becoming more and more unscientific to dogmatise on slight bases of fact; the geologists now, of all persons, crying out for full proof of the facts and theories enunciated.

NOTES.

DIPTERA.

Two New British Diptera.—On the 20th July last, whilst collecting in the New Forest, near Lyndhurst, I took a single specimen of Mallota eristaloides. I did not at the time know what a prize I had found; but thought it was an Eristalis or Criorrhina. The insect, however, was new to me, so I kept a good look out for more, but without success, the weather being unfavourable for diptera during the few remaining days of my stay. I recently took the specimen, with various other diptera, to the Natural History Museum, South Kensington, for identification, and it at once attracted the attention of Mr. Austin, who kindly named it for me. About the middle of ~~May~~ I also took in the June same locality a Pipunculida, about which Mr. Austin was doubtful at first, but has since identified as Nephrocerus flavicornis. Both insects are new to the British List of Diptera, and I have presented them to the National Collection.—Frederick C. Adams, 68, St. Ermin's Mansions, Westminster, and Fern Cottage, Lyndhurst.

Books Received.

"Science Gossip." "Entomologist's Record." "The Naturalist." "Le Naturaliste Canadiene." "American Monthly Microscopical Journal," &c.

EXCHANGE.

Duplicates.—Bembeciformis, Populata, Carpini, Litura, Flavago, Gemina Pisi, Tages, Micacea, Testacea Advenaria, Ferruginea, Lactearia, L. comma, Alsines, Neustria, and fifty species preserved larvæ. *Desiderata*, very numerous.—J. Hame, 151, Chiltern Street, Hull.

Wanted, Busk's Catalogue, and pamphlets on Polyzoa.—J. Smith, 121, Bewsey Terrace, Warrington.

Wanted, living specimens of any of the Orb-weaving Spiders (Epeirides and Ulobonides). for which cash or good exchange will be given.—John Rhodes, Technical School, Accrington.

Duplicate Coleoptera.—Dorytomus vorax, Pt. oblongo-punctatus, Deporæiis betulæ, C. campestris, Rhizophagus bipustulatus, Pogonus luridipennis (2), S. cylindricum, Melanotus rufipes, Cleonus sulcirostris, Melandrya caraboides, &c. *Desiderata*, numerous.—F. W. Lambert, 70, St Giles, Oxford.

Duplicates.—Adippi (fine and long series), Cardamines, Alveolus, Fages, Lucina. Tithonus, Geryon, Edusa (males). *Desiderata.*—Blandina, Zonaria, and many others, (Fine and well set only.)—F. W. Lambert, 70, St. Giles, Oxford.

Coleoptera.—*Duplicates*: Phinus germanus, Cænopsis waltoni, Amalus scortillum, Phytobius 4-tuberculatus, Tachys bistriatus, Anthonomus rosinæ, Ochina hederæ, Dryophilus pusillus, Platytassus echinatus, Apion vernale, Scymnus mulsanta, S. hæmorrhoidalis, S. frontalis, Telephorus hæmorrhoidalis, Anthicus instabilis, &c. *Desiderata*: Offers of scarce and local Coleoptera.—A. Ford, Glen Mount, Braybrooke Road, Hastings.

Duplicate Lepidoptera.—D. caprophila,* E. venosata,* V. urticæ* (Manx), X. cerago,* X. silago,* P. pulchrina, P. iota, S. menthastri (larvæ and imagines), H. elutata, H. oculea, M. strigilis, L. pallens, L. impura, T. orbona. *Disiderata*: numerous.—H. Shortridge Clarke, Sulby Parsonage, Lezayre, Isle of Man.

Wanted.—The following numbers of *Knowledge*:—Nos. 188 and 190, vol. vii. (1885); Nos. 192, 194, 197, 199, 201, 204, and 206, vol. viii.—G. A. Lewcock, 5, Minet Gardens, Harlesden, N.W.

Preserved Larvæ.—*Duplicates*: Quercus, Urticæ, Jaccobæ, Caja, Bucephala, Lanestris, Carpini, Cœruleocephala Cossus, Porcellus, Atalanta, and Menthastri. *Desiderata*: Any of the clearwings Sponsa, Nupta, Promissa, Villica, Dominula, B. rubi, Plantaginis, Batis, and many others.—S. B. Chandley, Latchford, Warrington.

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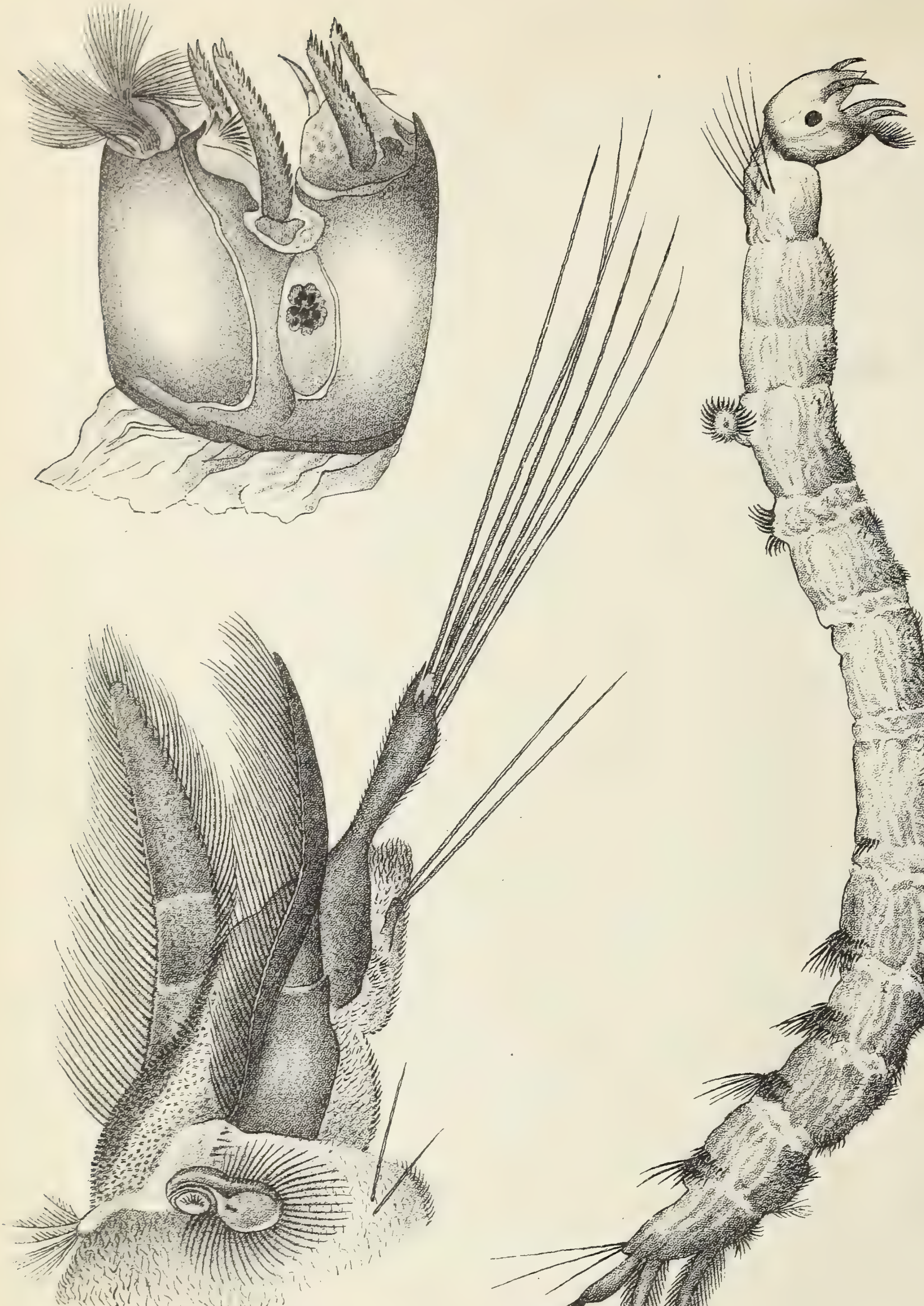
PLATE XI.



LARVA OF DIXA.

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SOME CURIOUS AQUATIC LARVÆ.

BY GEORGE SWAINSON, F.L.S.

(Continued from page 140.)

We must next introduce to you the most remarkable aquatic larva we have ever met with. It belongs to the *Dixa* genus, and I believe there are four species of this dipterous fly found in the British Isles. Our three specimens were captured in a running stream near Port Erin, in the Isle of Man, in August, 1892, adhering to a water plant, and we believe this was the first record of this singular larva being found in this country, though immediately after it was found by Professor Miall in a pond near Leeds. It may possibly have been taken by many a pond-hunter who, like ourselves, at first would be completely puzzled with it, there being no account given of it in any English publication. Its habits, as well as its shape, are so peculiar, and further specimens so difficult to obtain, that we are hardly yet at the end of the various puzzles relating to it. This larva was first discovered by the old French naturalist, M. De Réaumur, and described in 1714[*] and though he was mistaken in several points I cannot do better than let him describe it in his own words.

" It is not surprising," he says, " that this singular aquatic worm has escaped the notice of naturalists. It is rare, rather small, and at first sight has nothing very singular about it. However, after a little study it appears to well merit some attention. The smallest insects and the largest animals come from the same Hand and bear equally the impress of the Great Artificer. Our aquatic worm is only seven or eight lines in length. It, however, seems to belong to a class of its own, at least we know of no other class with which it can be included. Terrestrial animals live on land, aquatics in water, and amphibians sometimes on land and sometimes in water. This one has the two extremities of its body aquatic. Its head and tail are always in the water, and the rest of its body is always out of the water. To understand this one must know its shape. Like many insects, it is composed of different rings. It has eleven rings between the head and the tail. They are all almost circular, or it resembles the beads of a chaplet threaded one after another. This insect is almost always bent double in two parts like a siphon. I must remark that one of these parts is longer than the other, and that they are both almost parallel to each other, so that the head and the tail are always near, the one to the other. The part that goes from the bending to the tail is a little longer than that which goes from the same bending to the head. It is, however, the sixth ring which is generally in the middle of the elbow, or that part where the animal is bent. But the five rings that form the tail side are larger than the five that form the head side. There are only the head and the tail, and the ring nearest to the tail, that are constantly in the water; the nine other rings, or at least seven of the other rings, are out of it. This insect also keeps close to the edge of still water, agitated water would not suit it; as soon as the water covers it a little more than we have said it is ill at ease and withdraws itself. If, on the contrary, the water covers it less, it instantly goes further into it. This worm being only about eight lines in length, it would not be easy to make observations when it is at the edge of a large piece of water, therefore it was in examining it in glasses or cups, that I observed what I have just described. I always saw it attach itself to the sides of the vessel in such a manner that its head and tail were in the water and the rest of its body out of it. If, in inclining the vessel in one direction, I obliged the water to cover it more, it instantly withdrew itself. If, in inclining the vessel in a contrary direction, I obliged the water to leave it, it hurried quickly in search of the water it had lost. For the rest, its manner of walking or crawling caused me to examine it more closely. It appeared to me to merit a place among the progressive movements of the aquatic animals of which I have spoken in different memoirs. In its natural manner of walking it is the middle of its body which advances first towards the place to which the animal is approaching, that is to say, the sixth ring is most in advance and seems to lead the rest of the body, as the head does in fourfooted animals. In a word, while this animal is in the act of advancing, it remains doubled up like a siphon, and it is the sixth ring, in the middle of the body, that goes first. It is not with a wormlike movement that it advances. It has legs, though they are very small, and cannot be properly seen without the aid of a powerful glass. These legs are one of its peculiarities. *They are attached to its back*, that is the side opposite to the stomach. The insect continually lies on the back, and its mouth is turned upwards. This last circumstance is not peculiar to it. We know some species of flies and aquatic insects that always swim on their backs because they feed on insects that swim or walk on the surface of the water. We shall soon see that for a similar reason it was necessary that our insect should always have its head turned upwards. Its legs are short and formed something like the last legs of silkworms."

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[*] " Histoire de L'Academie Royal des Sciences," Paris, 1714, page 203.

For a long time we were firmly of opinion that M. de Réaumur was correct as to the two anterior pairs of pseudopeds being attached to the dorsal side, even after two lots of living specimens had been sent me by Professor Miall, but M. de Réaumur was certainly wrong in the rest of his description of the legs, for he clearly mistook the long setæ, with which the other segments were furnished, for feet. I don't wonder very much at this considering the very inferior apparatus which the old Frenchman had to use, for these curious creatures are almost impossible to examine with nicety, as they will not keep in the water of the zoophyte trough but constantly force two-thirds of their body, that part containing the sixth segment, upwards through the top film of the water, either along the sides of the glass or up the stalks of the water plants. Besides, this description was fully confirmed by the old Swedish naturalist, Baron De Geer ("Histoire des Insects," vol. 6, page 380), who was the first to give the life history and metamorphosis of the larva. When, however, I had overcome the difficulty of translating from Danish the next description by Dr. Stœger,* I found that he had satisfied himself that these two pairs of false feet are on the ventral side of the body, and that the creature has *not* its feet *on the back of its neck*, as I at first thought, long before I found out M. de Réaumur's account. This has been more recently proved by ribbon sections cut by Professor Miall and myself, which show that the ventral nerve cord runs on the same side as the pseudopeds. These I hope to show later on by reproducing the micro-sections. The arrangement of the ventral setæ is very peculiar, those near the head being inclined towards that organ, while the others are inclined from the sixth segment towards the tail. The smaller setæ on the dorsal side of the fifth, sixth, seventh, and eighth segments incline in both directions, according as the end of the segment is towards the head or the tail. We can now follow M. de Réaumur once more.

"Now the animal being doubled in two, though its legs are differently inclined with respect to the head, they are turned towards the same side and disposed in a similar manner with regard to the sixth ring, consequently they can all concur in advancing this ring to a certain point, as the legs of other animals advance their heads. In short, it is easy to see how these legs, whose extremities are turned to the head or the tail of the worm, serve to move it. It has only to carry its legs backwards or towards the middle ring and it will walk directly. But if it wishes to go backwards or to make its head and tail go first, its legs cannot serve it. To move itself in this way it has only its vermicular movement, made use of much more rarely and with much greater difficulty than the other. Besides the movements of which we have spoken, this worm can execute two others by means of its legs. It can move sideways, because its legs are not only movable from front to back but from right to left and from left to right. Sometimes it makes use of this movement when it wishes to go only a very short distance, moving parallel to its doubled-up parts. When entirely plunged into water it extends itself its full length and swims like other worms. After all, it appears to me that it never goes into open water unless compelled, and then always regains its bank as soon as possible, and places itself with its mouth turned upwards. The mouth is surrounded by four little tusks or hooks like the mouths of voracious insects. From the middle come two other parts like tufts. The animal is continually agitating these little tufts. It lengthens and retracts them, moves them from right to left. This little agitation keeps the water moving. It even seems to draw the water a little, as if the insect were breathing. What is certain is that while it is quickly moving these little tufts the tiny creatures that swim in the water near enough are drawn near the mouth and dexterously captured. As soon as some little creature is drawn near enough the insect advances its head and greedily seizes it and swallows it. In this manner I have seen it capture insects so small that they could not be perceived without the aid of a good glass. Though its prey is so small it eats a good deal in proportion to its size, for it is continually taking these tiny creatures into its mouth."

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* Page 202, "Naturhistorisk Tidstkrift," Cophenhagen, 1842-3.

If our readers will now turn to the illustration of *Dixa* (Plate XI.) which Mr. Hammond, F.L.S., has kindly drawn from the best of my mounted specimens, they will see from the position of the head, apparently turned quite round, how easy it was for the old French naturalist to mistake the dorsal for the ventral side. The larva is of a very dark brown colour, the setæ and bristles being almost black, the head itself and the tusks being of a much lighter brown. The long setæ on the first segment next to the head and the last four segments are very noticeable. Mark, this is the appearance of the larva as it swims through the water, or at all events as the spirits of wine killed it in all the three specimens mounted. It was quite impossible to say how its head was fixed when I had it in the zoophyte trough and forced it down into the water, for its motion was too rapid for careful observation, but it is very certain that its normal condition is bent up in this form : ∩. The large mouth is furnished with many small bristles and maxillaries and some other flat organs which moving horizontally are kept in constant activity; there are two large ones in the upper and two in the lower jaw. These are serrated on the outer edge, and appear open tubes through which I fancied water entered. Between the two larger tusks there are some minute teeth shaped like a fan, intended, I fancy, to serve the same purpose as the saw-like organs in the mouth of *Corethra plumicornis* (Fig. 5 c, plate V., page 107). The two eyes are very noticeable in the centre of the head on either side. When you have the head under the microscope they can only just be seen, but when you take a side view they are very distinct, and the cavity is also clearly seen from which the antennæ or tufts are protruded. These De Geer calls *barbillons*; they are formed like brushes composed of a large number of different kinds of bristles split at the extremities and opened out. The whipping action of these hairy tufts is most curious and effective, for when the *Dixa* wishes to draw in nourishment the head is turned right back on the dorsal side and the tufts instantly begin to play. The neck joining the head to the first segment is very loose and flexible. I cannot yet satisfy myself whether the head is twisted half round or simply laid back, for the authorities are completely at variance as to which is the upper and which is the lower lobe of the head. Stœger, differing from Réaumur and De Geer, says "A brush of fine bristles springing up from the front and upper part of the sides extends over the head," while the most recent investigator, Professor Meinert,* asserts that "the larva of *Dixa* procures its food in the same manner as the larva of *Anopheles*, making use of its rotatory organs to put the water in motion. It *cannot* at any time bend round its head like this larva, but rather bends it back in such a manner that the summit of the head nearly touches the upper surface of the thorax." Now I want some of your readers who may be lucky enough to find this larva to try and settle this point, for I am still in doubt whether the head is not turned round as in *Anopheles*, though I must say I don't think so. The question is whether the tuft of protrusile hairs is a beard or a "top-knot." If Stœger is right, then *the eyes are placed*, though near the centre, yet certainly *in the lower lobe of the head*, and I don't know another instance of a similar kind. We have heard a good deal about the "pineal" eye found near the top of the head in the vertebrates, and recently we have heard from Mr. Hornell of the third eye in the Copepod, *Monstrilla Anglica*, found on the Jersey coast, but he writes me in this case the mouth opening is distinctly under the third eye. It may be that this rotatory organ is not a beard, for as the larva throws its head back on the dorsal side constantly the eye may have become developed in this abnormal position, as certainly it is just where the creature would find its vision most needed to capture the minute infusoria on which it feeds all the time the tuft is playing, especially when one brings to mind the fact that in *Gyrinus* (the whirligig beetle) there are four eyes, or rather the eyes on each side are divided, two that look upwards towards the air to warn the insect against its enemies from above, while the two lower ones peer downwards into the water on the look out for food. The eyes in the larva of *Dixa* will therefore be somewhat unique if the protrusile tuft is a "top-knot."

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*"Eucephalous Larvæ"—Proceedings of the Royal Society of Copenhagen, 1885-6, page 486.

We have recently been taking some very young forms of Sole and Plaice in the estuary of the Ribble with a view to mount specimens showing the gradual change in the position of their eyes; for they leave the egg with true bilateral eyes, but the one on the under or white side gradually changes to the top of the head, and then moves slightly down the upper or dark side to the final position so well known by everyone. If, however, the rotatory organ in *Dixa* is a "top knot," then the eyes must have been evolved in the lower lobe of the head to enable the insect to capture its prey rather than to enable it to escape from its enemies; though this latter function would seem to be the main reason for the special development of the eyes in most insects, especially when fully matured.

(*To be continued.*)

THE SEXUAL DISTINCTION OF INSECTS.

BY C. W. DALE.

(Continued from page 240.)

IV.—Disparity of Antennæ.

Among the Butterflies, Sphinges, and Tortrices there is very little difference between the antennæ of the two sexes, but in certain species of the Bombyces, Noctuæ, Geometræ, and Tineæ there is a great deal of difference—those of the males being beautifully feathered, while those of the females are plain. The best instance I know is that of Ptilophora plumigera. Among the Bombyces the males of the Bombycidæ, Chelonidæ, Saturnidæ, Liparidæ, Notodontidæ, and Zeuzera and Ino have feathered antennæ. Those of the Lithosidæ and Euchelidæ, Hepialus and Zygæna, have not. Among the Noctuæ are Heliophobus, Pachetra, Dasypolia, Gonoptera, Rusina, and Agrotis valligera. Among the Geometræ are Ennomos, Biston, Himera, Hybernia, Phigalia, Nyssia, Amphidasis, Boarmia, Cleora, Fidonia, and several other genera. Among the Tineæ are Psyche, Fumea, and Incurvaria, Zinckenii and masculella. In the Diptera are the genera Ctenophora, Rhippidia, Culex, Anopheles, Corethra, Chironomus, and Tanypus. In Hymenoptera is the genus Lophyrus.

Branched antennæ.—In the Hymenoptera the males of the genera Ceraphron and Eulophus have beautifully branched antennæ, somewhat resembling the antlers of a stag. In Coleoptera the males of Ptilinus pectinicornis, Corymbites pectinicornis, Corymbites cupreus, Microrrhagus pygmæus, Polyphila fullo, Melolontha vulgaris, Ripiphorus paradoxus, and the three species of Pyrochroa, are good examples of this type.

Thickened antennæ.—Among the Sphinges, the males of Smerinthus and Trochilium have serrated antennæ; but in Cossus ligniperda both sexes have the antennæ serrated. The males of the Phycidæ have their antennæ so thickened at the base as to have earned for them the name of Knot-porus. Among the Tineæ, the males of Eidophasia Messingiella have much thicker antennæ than the females; but in Dasycera sulphurella they are thick in both sexes.

In Diptera the males of the Cecidomyidæ and Psychodidæ have serrated antennæ.

In Hymenoptera the males of Eurytonia have nodose joints to the antennæ furnished above with long hair.

In Coleoptera the males of Prionus and the Buprestidæ have the antennæ much thicker than the females; but in Sarrotrium both sexes have equally thick antennæ.

Long antennæ.—In Lepidoptera the males of Adela, Nematori, and Nemophila have antennæ more than twice the length of the antennæ of the females. The males of Coleophora, also, have antennæ much larger than the females have; but in Phibalocera quercana both sexes have long antennæ.

In Hymenoptera, one of the bees—Eucera longicornis—has the antennæ of the male more than double the length of those of the female. In Coleoptera the males of Quedius rufipes and boops, Prognatha quadricornis, Bryaxis sanguinea, Læmophlœus duplicatus, pusillus, and ferrugineus, Corymbites tessellatus and quercus, Limonius cylindricus, Eros aurora, Ptinus fur, Dryophilus pusillus, Malthinus frontalis, and the various species of Telephorus, Luperus, Cryptocephus, and a few other genera. The maximum of length, though, is met with in the males of the Longicornes—most notably in Astynomus ædilis. In one male of this species, which I have, the antennæ measure no less than seven inches from tip to tip; but I have no female which measures more than three inches. In one species, Eutheia placata, the antennæ of the female are one fourth longer than those of the male —a solitary exception to the general rule. In a few instances the number of joints varies in the two sexes, thus: the males of Prionus, Molorchus, and Nacerdes have the antennæ 12-jointed, while those of the females have only the usual number 11; and in Holoparamecus depressus the female has 10 joints to the antennæ, while the male has only 9. Pria dulcamara has the club of the male composed of 4 joints, while that of the female has only 3—a fact which caused Stephens to place the sexes in seperate genera. In the following species, we also find the club of the antennæ longest in the male: Serica brunnea, Rhizotrogus, Throscus dermestoides, Anthrenus claviger, Megatoma undata, &c.; while the male of Attagenus pellio has the last joint of the club as long as the whole of the other joints put together. The male of Anthribus albinus bears at the end of each joint a tuft of white scales.

In Diptera the males of Tipula flavolineata and longicornis, and of Bolitophila fusca have much longer antennæ than the females; but in Maceocera both sexes have long antennæ. The male of Rhapium longicorne, also, has much longer antennæ than the female.

V.—DISPARITY OF PALPI.

The males of Hylecœtus dermestoides and Lymexylon navaie, two of the Coleoptera, may be distinguished from the females by the large size of the palpi. In Hymenoptera, the maxillary palpi of the males of Mesopolobus, a sub-genus of Pteromalus, are furrate, the third joint being externally prolonged.

VI.—DISPARITY OF EYES.

In the Diptera, the sexes may be distinguished from each other by the position of the eyes, the males having them close together, the females far apart. This is especially the case in the Tabanidæ, Stratiomyidæ, Syrphidæ, and Muscidæ.

In Coleoptera, the eyes of a few species are more strongly developed in the males than in the females. Examples are Lampyris noctiluca, Ptinus lichenum and fur, Dryophilus pusillus, Luperus flavipes, Lagria hirta, and Euglenus oculatus—where the eyes of the male are nearly in contact.

VII.—DISPARITY IN LEGS.

In Lepidoptera, the only species I know of which can be separated, the one sex from the other, by the legs, are those of the genus Herminia, called fan-foots; the front legs of the male bearing a large tuft of hair.

In Hymenoptera the males of Anthophora retusa and pilipes have a most peculiar pair of middle legs, with long hairs projecting from them. On the other hand, the female of Dasypoda hirtipes has a most peculiar pair of hind legs, being covered with dense fulvous hair. In the genus Platymesomus the middle tibiæ of the male are dilated. Cheiopachus has the posterior femora of the males and the anterior femora of the females thickened.

In Coleoptera the most remarkable example is Œdemera nobilis, in which the hind thighs project from the sides like huge knobs; others are Osphya bipunctata, Oncomera femorata, Necrodes littoralis, Stenus Juno, Megarthrus denticollis, Telmatophilus caricis, and Rhynchites betulæ; all the males of these have the hind thighs much thickened. In the males of Clytus the hind thighs are much elongated, and the same sex of Callidinum alni has the hind thighs greatly curved. The males of Anthophagus have the anterior tibiæ emarginate. The little genus Bryaxis presents some curious sexual modifications of the anterior trochanters; for the study of which and of the various and numerous sexual characters presented by the legs and feet of the Coleoptera, the reader is referred to the excellent article by Dr. Ellis on the "Secondary Sexual Characters of the British Coleoptera," contained in the *British Naturalist*, vol. ii., pages 209 and 233.

In Diptera the male of Ochthera mantis has a most peculiar pair of front legs, being very much thickened in the middle. In Empis the males generally have longer legs than the females. In the males of the Dolichopidæ the tarsi are often peculiarly formed or marked, or the femora fringed beneath, or the tibiæ thickened, mostly the hind pair, which have also a sort of variole in some. In Dolichopus plumiper, pennatus, and popularis the middle tarsi are dilated and feathered.

VIII.—DISPARITY IN HEADS.

This may be especially seen in the Coleoptera, several males of which bear upon their head horns of various degrees of development, especially in the genus Onthophagus. In Onthophagus vacca the horn is straight; while in taurus, instead of a horn springing from the middle of the head, we have the two extremities developed into long curved horns like those of a Spanish ox. In ovatus alone of the British species is the horn absent. The male of Copris lunaris is also furnished with a horn; as are, also, those of Odontæus mobilicornis, Sinodendron cylindricum, and some of the Bledii. The males of the genera Ennearthron and Gnathocerus have two short horns in the clypeus. Many species of Cis have the clypeus deeply notched in the male; whilst those of the Malachii have the head deeply and transversely impressed. In Hymenoptera the male of Cerocephala formiciformis has a curiously tricornuted head; and the female of Cratomus megacephalus has an unusually large head.

IX.—DISPARITY OF JAWS.

This may be best seen in the Coleoptera. The males of Lucanus, Dorcus, Broscus, Emus, Creophilus, Ocypus, Staphylinus, Philonthus, Quedius, and Oxyporus may be distinguished from the females by the jaws or mandibles being very much larger and more powerful.

X.—DISPARITY IN ABDOMENS.

Whilst the sex of every insect can be determined by an examination of the abomen, still the difference is not always apparent to the naked eye. However, in the Lepidoptera it is easily discerned in Liparis, Dasychira, Gastropacha, and Nonagria by the large size of the female's abdomen, that of Liparis monacha being furnished with a most visible ovapositor. The female of Macrogaster arundinis has an unusually long abdomen, and those of Chilo and Orthotælia have them longer than the males. A greater difference may be seen in the sexes of Eriogaster lanestris, the male having a bushy tuft of hair at the tip; whilst the female has an abdomen of large size, the end being as it were swelled into a large grey ball. Many males of the Lepidoptera possess an anal tuft of hair, and may be distinguished by it, but in Sesia it is possessed by both sexes, although of different shape.

Sting.—All the females of the Fossorial Hymenoptera are armed with stings, exept those of Formica, Tapinoma, Andrena, Ciliosa, Dasypoda, and Macropis. The females of Chrysis, Hedycheum, and Ichneumon also have stings, but to a less degree.

These must not be confounded with the sting inflicted by the Hemipterous genus, Notonecta—which is done by means of its rostrum; nor with the stings of the Culicidæ and Tabanidæ, which are caused by the skin being pierced by the proboscis and blood sucked.

Stout anal spike.—Two families of the Osthoptera—Acriolidæ and Locustidæ—are distinguished from each other by the females of the former possessing a long sword-like spike. In the Achetidæ, the females of Acheta and Nemoria also possess it, but not of Gryllotalpa. In the Hymenoptera the females of Sirex, Xiphydria, Xyela are possessed of tolerably long spikes or borers; and those of Cephus, Janus, Clepter, and some of the Chalcididæ and Cynipidæ, of short ones.

In the Diptera the females of the Tipulidæ, Cecidomyidæ, and Xylophagidæ are possessed of short anal spikes or borers.

In Coleoptera the females of Lymexylon, Hylecœtus, Astynomus, and a few others, are possessed of short borers; but in Mordellæ both sexes have anal spikes.

Flexible anal spikes.—The females of Fœnus, Rhyssa, Pimpla, Cryptus, Bracon, Spathius, Agathis, Microelus, and Callimone are possessed of long flexible anal spikes or borers. All these spikes are composed of three pieces which fold together into one.

In Neuroptera the females of Raphidia are furnished with anal spikes.

Saws.—The females of the Tenthredinæ have a saw at the extremity of the abdomen.

Forceps.—Both sexes of the Frefrinlidæ and the Odonata possess forceps at the end of the abdomen ; those of the males are stouter and stronger than those of the females. The males of Panorpa have a curious flexible appendage, furnished with forceps, at the end of the abdomen.

Postscript.—The males of the Corcidæ are furnished with two long filament tails at the end of the abdomen, but in the Ephemeridæ both sexes have them.

XI.—Disparity of Light.

I should think the light emitted by the glow-worm is known to everybody, but perhaps it is not known to all that it is the female of a beetle, Lampyris noctiluca, the male of which is winged, and flies to lighted candles and lamps. It also emits a light, but to a much less degree than the female. Two others of our British beetles emit a feeble light—namely, Phosphænus Hemipterus and Staphylinus erythropterus.

In Britain, unfortunately, we have no representative of Lantern Flies, species of Fulgora, a genus of the Homoptera. So I think this is a fit place to bring my essay to an end ; remarking first, that the great disparity between the sexes of some species led the fathers of our Science to describe them as distinct. Secondly, that Linnæus and Fabricius are the fathers of our Science ; and Hubner and Haworth especially of the order Lepidoptera.

I think a few examples will be sufficient to illustrate my meaning :

1. Satyrus justina of Linnæus is the female of Janira of Linnæus.
2. Lithosia deplana of Fabricius is the female of guadea of Linnæus.
3. Lithosia depressa of Esper is the female of deplana of Esper.
4. Bombyx pannio of Linnæus is the female of russula of Linnæus.
5. Limacodes bufo Fabricius is the female of testudo of Linnæus.
6. Hepialus jodutta of Haworth is the female of Hectus of Linnæus.
7. Fidonia tiliaria of Linnæus is the female of piniaria of Linnæus.
8. Camptogramma gemmata of Hubner is the female of fluviata of Hubner.
9. Hybernia incompletaria of Haworth is the female of aurantiaria of Linnæus.
10. Anisopterex opteraria of Haworth is the female of æscularia of the Vienna Catalogue.
11. Tætricodes tortricella of Hubner is the female of hyemana of Hubner.
12. Diurnea novembris of Haworth is the female of phryganella of Hubner.
13. Xymastodona atrella of Stephens is the female of melanella of Haworth.
14. Teugyria sanvitale of Latreille is the male of Methoca ichneumonoider of Latreille.
15. Myrmecomorphus rufescens of Westwood is the female of Embolemus Ruddii of Westwood.
16. Cochleortonus vorax of Sodffsky is the female of Drilus flavescens of Oliver.
17. Statiphaga lutaria of Fabricius is the female of stercoraria of Linnæus.

PART III.

Systematic List of GENERA and SPECIES with Synonyms of the latter.

BY THE REV. F. O. PICKARD-CAMBRIDGE, M.A.

(Continued from page 241.)

FAMS.: SUB. FAMS.	GENERA.	PUBLICATION.
Araneæ Theraphosæ		**Tetrapneumones**
Atypidæ		
Atypinæ		
Atypus, LATR. 1804.		
	PICEUS, *SULTZ, 1776.*	
	Atypus piceus,	CB. Spid. Dor., vol. i., p. 2, Pl. ii. 2.
	,, ,,	CB. A.M.N.H. xvi., p. 238, Pl. viii. 2.
	,, *Sultzeri,*	BL. Spid. Gt. Bt. Ir., p. 14, Pl. i. 1.
	,, ,,	CB. Syst. List. Bt. Spid. T.L.S. xxx., p. 320.
	,, *affinis,*	CB. Syst. List. Bt. Spid. T.L.S., xxx p. 320.
	,, *Blackwallii,*	CB.Spid.Dor.,vol. i.,p.4
	,, ,,	CB. A.M.N.H., 4, xvi. p. 241.
	BECKI, *CAMBR. 1875.*	
	Atypus, Becki,	CB. Spid. Dor., vol. 1, p. 4.
	,, ,,	CB. A.M.N.H., 4, xvi., p. 242, Pl. viii. 1.
Araneæ Veræ Cribellatæ*		**Dipneumones**†
Uloboridæ		
Uloborinæ		
Uloborus, LATR. 1806.		
	WALCKENAERIUS, *LATR. 1806.*	
	Veleda lineata,	BL. Spid. Gt. Bt. Ir., p. 150, Pl. x., 96.
	Uloborus Walckenaerius,	CB. Spid. Dor., vol. ii., p. 285, Pl. vi., 2.
	Uloborus Walckenaerius,	Sim. Ar. Fr., vol. i. p. 170.

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* The complete separation of the spiders which possess the calamistrum and cribellum from those that do not possess these organs must by no means be regarded as finally determined upon.

† The sub-division of the order into *Tetrapneumones* and *Dipneumones*, based on the number of the Pulmonary Sacs, will still hold good for the British Fauna; but the presence of *Hypochilus*, a tetrapneumonous spider amongst the *Araneæ Veræ*, lessens the value of the distinction when applied to the whole known Araneidal Fauna.

FAMS.: SUB. FAMS.	GENERA.	PUBLICATION.
Uloboridæ		**Dipneumones**
Miagrammopinæ		
Hyptiotes, WALCK. 1833.		
	PARADOXUS, *C.K. 1834*	
	Hyptiotes paradoxus,	CB. Spid. Dor. vol. ii., p. 532.
	Mithras, BL. A.M.N.H., 1862.	
	Hyptiotes ,,	Sim. Ar., Fr., vol. i., p. 232.
Dictynidæ		
Amaurobius, C. K. 1837.		
	FEROX, *WLK. 1830.*	
	Amaurobius ferox,	CB. Spid. Dor., vol. i., p. 56.
	Ciniflo ,,	BL. Spid. Gt. Bt. Ir., p. 142, Pl. ix. 90.
	,, *mordax,*	BL. Spid. Gt. Bt. Ir., p. 142, Pl. ix. 90.
	Amaurobius ferox,	Sim. Ar., Fr., vol. i., p. 232.
	SIMILIS, *BLK. 1859.*	
	Amaurobius similis,	CB. Spid. Dor., vol. i., p. 54.
	Ciniflo ,,	BL. Spid. Gt. Bt. Ir., p. 141, Pl. ix., 89.
	Amaurobius ,,	F.Cb. A.M.N.H., 6, x., p. 389, Pl. xxi., 10.
	,, ,,	Sim. Ar., Fr., vol. i., p. 228.
	FENESTRALIS, *STRM. 1768.*	
	Amaurobius fenestralis,	CB. Spid. Dor., vol. i., p. 56.
	Ciniflo atrox,	BL. Spid. Gt. Bt. Ir., p. 140, Pl. ix., 88.
	Amaurobius fenestralis,	F.Cb. A.M.N.H., 6, x., p. 389, Pl. xxi., 11.
	,, ,,	Sim. Ar., Fr., vol. i., p. 226.
Dictyna, SUND, 1770.		
	PUELLA, *Slm. 1870.*	
	Dictyna variabilis,	CB. Spid. Dor., vol. ii., p. 466.
	Ergatis pallens,	BL. Spid. Gt. Bt. Ir., p. 148, Pl. x., 9.
	Dictyna puella,	Sim. Les. A. de Fr., vol. i. p. 180.

(To be continued.)

REPORTS OF SOCIETIES.

THE SOUTH LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY.

Thursday, October 11th, E. Step, Esq, President, in the chair.

Mr. E. H. Trenerry, of Clapham Park, was elected a member.

Mr. Oldham exhibited the following species from his own garden at Woodford :—A very varied series of *Triphœna pronuba*, L., series of *Torbona*, Hufn., and a few *Plusia gamma*, L.

Mr. R. Adkin, on behalf of Mr. South, series of *Pædisca sordidana*, Hb.. *Peronia hastiana*, L., *P. comparana*, Hb., *P. comariana*, Zell., *and P. schalleriana*, L., from Macclesfield, and read notes; a long discussion took place on the perplexities in differentiating the last three species : on behalf of Rev. J. G. Greene, a series of well-executed drawings of the most striking vars of *Abraxas grossulariata*, L., bred by him during the last few years, and read notes : and on behalf of himself, series of *Acronycta rumicis*, L., from many localities, and a bred series of *Eupithecia jasioneata*, Crewe, from Ireland, and read notes.

Mr. Mansbridge, long varied series of *A. grossulariata*, and *A. sylvata*, from Yorkshire, and contributed notes.

Mr. H. Moore, a female *Lycæna corydon*, Fb., with male colouration, and specimens of *Bombyx quercus*, L., *Catocala nupta*, L., and *Ocneria dispar*, L., with a batch of ova of the last species, all from France. A long discussion on *O. dispar* ensued.

Mr. McArthur, series of *Toxocampa craccæ*, Fb., *Noctuæ glareosa*, Esp., *Acronycta rumicis*, L., and *Agrotis agathina*, Dup., all from N. Devon.

Mr. C. A. Briggs exhibited types of *Plusia ni*, Hb.

Mr. Winkley, a specimen of *Helix pomatia*, L., showing the temporary epiphragm formed at the commencement of hibernation.

Mr. Tutt, a narrow winged specimen of *Eupithecia subnotata*, Hb., *Agrotis ripæ*, Hb., from St. Anne's-on-Sea, and two specimens of *Eupithecia subfulvata*, Haw, var. *oxydata*, Tr.

Mr. Fenn series of *Cirrhœdia xerampelina*, Hb., from the Isle of Man, and series or examples of *Aporophyla australis*, Gn., *Epunda lutulenta*, Bork., *E. lichenea*, Hb., *Anchocelis lunosa*, Haw., *Calocampa vetusta*, Hb., and *Xylina semibrunnea*, Haw., all from Deal.

Mr. Tugwell and Mr. Tutt exhibited a large number of Scotch and Swiss specimens of *Zygæna exulans*, Hoch.. and contributed papers thereon. A considerable discussion ensued.—HY. J. TURNER, Hon. Report Secretary

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October 25th, 1894, E. Step, Esq., President in the chair.

Mr. Hy. Lamb, of Maidstone, and Mr. Arthur Cosway, of Watford, were elected members.

Mr. Jobson exhibited a var. of *Abraxas grossulariata* L., from his garden, having only a few black scales in place of the usual markings.

Mr. McArthur, bred series of *Hypsipetes sordidata*, Fb., from N. Devon, the lighter specimens from bilberry-fed larvæ and the darker ones from sallow-fed larvæ.

Mr. Frohawk xanthic examples of *Epinephele hyperanthes* L., and *E. janira*, L. A long discussion ensued as to the causes of this class of variation and the effect upon the imago of injuries to the larva and pupa with the bearing of Weismann's theory thereon.

Mr. Tutt, perfectly white vars. of *Emydia cribrum*, L., from the Alps, with New Forest examples for comparison; also two specimens of the new British species *Cataplectica farrenii*, Wals., from Cambs.

Mr. Mansbridge, the dry carcase of a mole taken from a barn door, which was covered with lepidopterous coccoons and pupa cases.

Mr. H. Moore, two specimens of the Violet Carpenter Bee, *Xylocopa violacea*, from Podensac Gironde.

Mr. R. Adkin, bred series of *Asphalia ridens*, Fb., from the New Forest; and a *Lycæna ægon*, Schiff., from Oxshot having the two costal spots on the underside of the lower wing united.

Mr. T. W. Hall, a species of *Julicidæ* found at Stevens' sale rooms.

Mr. Step read the report of successful fungus foray of the Society, on October 13th, at Esher and Oxshot. The methods of preserving fungi were discussed at some length.

Mr. Tutt read a paper entitled *Zygæna carniola*, Scop., and its varieties, in which he gave a graphic description of the scenery at the foot of Mont Blanc and the delight afforded to an entomologist by the beauty and abundance of the lepidoptera to be obtained there.—Hy. J. Turner, Hon. Report Secretary.

On December 13th, Mr. W. Mansbridge will read a paper on "The Lepidoptera of the Indian Territory U.S.A., as observed by himself in 1893-4, with special reference to allied British species."

ENTOMOLOGICAL SOCIETY OF LONDON.

October 17th, 1894.—Henry John Elwes, Esq., F.L.S., F.Z.S., President, in the chair.

Dr. H. G. Breyer, of Prætoria, Transvaal, South Africa, was elected a Fellow of the Society.

Mr. G. C. Champion read a letter, dated 15th August last, from Mr. J. Y. Johnson of Funchal, Madeira, on the subject of a recent visitation of Locusts to the island, and exhibited specimens. Mr. Johnson mentioned that Darwin, in his "Origin of Species," recorded that in November, 1844, dense swarms of locusts visited Madeira, He said that since then, until August last, these insects had not visited the island. Mr. Champion remarked that the species sent by Mr. Johnson was *Decticus albifrons*, Fabr., not a true migratory locust. Mr. Champion also exhibited specimens of *Anthaxia nitidula*, *Velleius dilatatus* and *Athous rhombeus*, taken by himself in the New Forest during the past summer.

Mr. H. Goss read a letter he had received from Captain Montgomery, J.P., of Mid-Ilovo, Natal, reporting vast flights of locusts there, extending over three miles in length, on the 31st August last, and exhibited a specimen of the locust, a species of *Acridium*. Captain Montgomery stated that, as a rule, his district and most of Natal was free from the pest, but that an exceptional invasion had occurred in 1850.

Mr. J. W. Tutt exhibited four typical specimens of *Emydia cribrum* from the New Forest, and, for comparison, four specimens of the variety *candida*, of the same species, taken at an elevation of 4,000 feet, near Courmayeur, on the Italian side of Mont Blanc. He stated that he had also met with this form in the Cogne Valley, at an elevation of from 6,000 to 8,000 feet.

Mr. R. Adkin exhibited for Mr. H. Murray a specimen of *Erebia æthiops*, in which the left forewing was much bleached, taken in August last, near Carnforth. Mr, Adkin also exhibited a series of *Acronycta rumicis* from Co. Cork, Ireland, including light and black forms, with examples from the Scilly Isles, Isle of Man, and North of Scotland for comparison.

Mr. Elwes exhibited a series of *Chionobas alberta* (male and female), *Chionobas uhleri*, var. *varuna*, and *Erebia discoidalis*, from Calgary, Alberta, N.-W. Canada, collected in May last, by Mr. Woolley-Dod, He said that the validity of *C. alberta*, which had been questioned by Mr. W. H. Edwards, was fully established by these specimens.

Professor Poulton gave an account of the changes he had recently made at Oxford in the arrangement of the Hope Collections in the Department of Zoology, and as to the rooms now available for students working at these collections.

Mr. G. T. Bethune-Baker communicated a paper, entitled "Descriptions of the Pyralidæ, Crambidæ, and Phycidæ, collected by Mr. T. Vernon Wollaston in Madeira."—H. Goss, Hon. Secretary.

LANCASHIRE AND CHESHIRE ENTOMOLOGICAL SOCIETY.

The opening meeting of the winter session was held on October 8th, 1894.

Mr. S. J. Capper, F.L.S,, F.E.S., in the chair.

Mr. C. S. Gregson stated that *Orgyia fascelina*, which he supposed had been exterminated from the sandhills, was in profusion at Formby in the larval state.

Mr. Percy Bright, F.E.S., of Bournemouth, made some interesting remarks on a case of Lepidoptera, which he had collected from the North of Scotland and brought with him for exhibition, including a series of a smoke form of *Spilosoma menthastri* from the North of Scotland, fine series of *Zygæna exulans* and *Crambus furcatellus* taken by himself this year at Braemar, *Sesia scoliaforis* from Rannoch, *Crambus myellus*, dark forms of *Leparis monacha*, from the New Forest, and *Tortrix piceana*, from the same locality, a dark strongly marked specimen of *Noctua glareosa*, from Montrose, and a chalky variety of *Syrichthus alveolus* from the New Forest.

Mr. F. N. Pierce, F.E.S. read a short note respecting the genitalia of two specimens of *Bombyx quercus*. During the evening the President exhibited a fine series of *Calymnia trapezina*.

Mr. Gregson specimens of *Lithosia serica*, taken by himself this year, *Melanippe hastata* var. *hastula*, Hb., from Sutherlandshire, and varieties of Arctic caja, bred by himself this year.

Mr. C. E. Stott, on behalf of Mr. H. S. Clark, of the Isle of Man, two specimens of *Sphinx pinastri*—J. N. PIERCE, Hon. Secretary.

HERTFORD NATURAL HISTORY SOCIETY.

The annual Fungus Foray of the Hertfordshire Natural History Society was held on Saturday, October 13th, in the neighbourhood of Aldbury. The members, who numbered more than at any previous fungus foray of the Society, assembled at Tring Station at half-past ten, and walked through the village of Aldbury and up the slopes of Moneybury Hill to the Bridgewater Monument, commencing the collection of fungi in the village, on an old tree near the pond, and being busily at work all the way. Some then walked to Little Gaddesden for lunch, others who had brought it with them partook of it by the monument, and while the most enthusiastic fungologists prosecuted their investigations in the immediate neighbourhood, others went farther afield, walking through the Avenue, about two miles in length, to Ashridge House, and returning by a more circuitous route through the park and over the common, searching for fungi all the way. With the exception of one member, who had to leave by an earlier train than the rest, for Luton, by way of Leighton, all had tea together at the Greyhound, in Aldbury, and then walked to Tring Station for the 4.51 train for Watford, St. Albans, and other places. The meeting was under the direction of Mr. Hopkinson, and the fungi which were collected were determined by Mr. George Massee, of Kew, Mr. Saunders, of Luton, recording the Mycetozoa. About 180 species were found, being the largest number hitherto met with at a fungus foray, and including many new to the county. One species, found by Miss Daisy Weall, of Watford, has only once before been detected in Britain.

A CATALOGUE OF IRISH COLEOPTERA.

BY REV. W. F. JOHNSON, M.A., F.E.S.

(Continued from page 208.)

AMARA FULVA, DEJ.—Cultra, co. Down (W. H. P.); Cushendun, co. Antrim (S. B.); Newcastle, co. Down (Champion); Greenore and Bellurgan, co. Louth (W. F. J.); Portmarnock, co. Dublin (McN.); Courtown, co. Wexford (H. C.); Tramore, co. Waterford (E. C.).

A. APRICARIA, STURM.—Near Belfast (A. H.); Dublin district (McN.).

A. CONSULARIS, DUFT.—Near Belfast (A. H.); Greenore co. Louth (W. F. J.); Portmarnock, co. Dublin (McN.); Courtown, co. Wexford (H. C.).

A. SPINIPES, AUCT.—Near Belfast (A. H.); Dublin district (McN.); Ardara and Coolmore, co. Donegal; Armagh, Carlingford, Greenore (W. F. J.); S. Dublin and S. Louth (H. C.).

A. CONVEXIUSCULA, MARSH.—Salt Marshes near Cork.

A. RUFOCINCTA, DEJ.—Portmarnock, co. Dublin (McN.).

A. BIFRONS, GYLL.—Portballintrae, co. Antrim (B. T.); Coolmore, co. Donegal; Greenore, co. Louth (W. F. J.); Portmarnock, co. Dublin (McN.).

A. OVATA, F.—Portballintrae, co. Antrim (B. T.); Cushendun, co. Antrim (S. B.); near Belfast (R. T.); Armagh, Carlingford, co. Louth (W. F. J.); S. Dublin (H. C.).

A. SIMILATA, GYLL.—Near Dublin (McN.); S. Dublin, Wexford (H. C.).

A. ACUMINATA, PAYK.—Near Belfast (A. H.); Craigavad, co. Down (W. H. P.); Armagh, Carlingford (W. F. J.); Dublin (McN.); Tramore (E. C.); S. Dublin, S. Louth (H. C.).

A. TIBIALIS, PAYK.—Coolmore, co. Donegal; Portballintrae, co. Antrim (W. F. J.); near Belfast (A. H. and R. S.); Dublin district (McN.); Newcastle, co. Down (Champion).

A. LUNICOLLIS, SCHIOD.—Portsalon, co. Donegal (R. S.); Cushendun, co. Antrim (S. B.); near Belfast (A. H.); Holywood, co. Down (W. H. P.); near Newtown Hamilton, co. Armagh (W. F. J.); Bundoran, co. Donegal; Howth, Carrickgallagher, co. Dublin (S. M.); Newcastle, co. Down (Champion).

A. FAMILIARIS, DUFT.—Cushendun, co. Antrim (S. B.); near Belfast (A. H. and R. P.); near Newtown Hamilton (W. F. J.); Portmarnock, co. Dublin (McN.).

A. LUCIDA, DUFT.—Portsalon, co. Donegal (R. S.); Armagh (W. F. J.).

A. TRIVIALIS, GYLL.—Portsalon, co. Donegal; R. Boyne, near Mornington, co. Meath (R. S.); Armagh, Greenore (W. F. J.); S.

Louth, Tallaght, co. Dublin (H. C.); Dublin district (McN.); Cork (M. B.).

A. COMMUNIS, PANZ.—Donegal, Antrim, Down, Armagh, Dublin, Wexford, Waterford, Cork.

A. PLEBEIA, GYLL.—Coolmore, Ardara, co. Donegal; Dunluce, co. Antrim (W. F. J.); near Dublin (McN.); S. Louth, Wexford (H. C.).

CALATHUS CISTELOIDES, PANZ.—Donegal, Antrim, Down, Armagh, Louth, Dublin, Great Arran Island, Wexford, Cork.

C. FUSCUS, F.—Portsalon, co. Donegal (R. S.); Whitepark Bay, co. Antrim (W. D.); Ardara, Coolmore, Greenore (W. F. J.); Tramore, co. Waterford (E. C.).

C. FLAVIPES, FOURE.—Cushendun, co. Antrim (S.B.); near Belfast (A. H.); R. Boyne, near Mornington, co. Meath (R. S.); Portmarnock, co. Dublin (McN.); S. Dublin (H. C.); Newcastle, co. Down (Champion).

C. MOLLIS, MARSH.—Portsalon (R. S.); Portballintrae (B.T.); Bundoran, co. Donegal, Bellurgan, co. Louth (W. F. J.); Portmarnock (McN.); S. Dublin, S. Louth, Courtown, co. Wexford (H. C.).

C. MELANOCEPHALUS, L.—Coolmore and Bundoran, co. Donegal, Portstewart, Portrush, Portballintrae, Giant's Causeway, co. Antrim, Ballinahinch, co. Down, Armagh (W. F. J.); Cushendun, co. Antrim (S. B.); near Belfast (A. H.); Clandeboye, co. Down (W. D. and W. H. P.); S. Louth, Wexford, Wicklow (H. E.); Dublin district (McN.); Cork (M. B.).

V. NUBIGENA, HAL.—Coolmore, co. Donegal (W. F. J.); Slieve Glah, co. Cavan (J. N. H.); Lugnaquillia, co. Wicklow, Great Arran Island (S. M.); Dublin mts. (H. C.); Dursey, co. Cork (G. C.).

C. MICROPTERUS, DUFT.—Ardara, co. Donegal, Portballintrae, co. Antrim, Clandeboye, Ballinahinch, co. Down, Carlingford, co. Louth (W. F. J.); Cushendun, co. Antrim (S. B.); Loughgilly, Armagh (H. L. J.)

C. PICEUS, MARSH.—Portsalon (R. S); Kildress, co. Tyrone, Armagh (W. F. J.); near Belfast (A. H.); Clandeboye (W. D. and W. H. P.); Loughgilly (H. L. J.); S. Louth, Beaupark, co. Dublin (H. C.); Ballyhaise, co. Cavan (J. N. H.); Dublin (McN.).

TAPHRIA NIVALIS, PANZ.—Coolmore, co. Donegal, Carlingford, co. Louth (W. F. J.); near Belfast (A. H); Rostrevor mt. co. Down (R. P.); Roundstone, co. Galway (B. T.); Portmarnock (McN.); Glendalough, co. Wicklow (H. C.).

PRISTONYCHUS TERRICOLA, HERBST.—Near Belfast (A. H. and R. S.); Armagh (W. F. J.); Dublin in cellars (McN.); Blackrock, co. Dublin (H. C.).

Sphodrus leucophthalmus, L.—Islandmagee, co. Antrim (a single specimen in a small collection made by Mr. Donaldson); Dublin, Malahide, co. Dublin (McN.); Termonfeckin, Drogheda, co. Louth, Blackrock, co. Dublin ("in my kitchen," H.C.).

Anchomenus angusticollis, F.—Cushendun, co. Antrim (S. B.); banks of R. Erne, above Ballyshannon (W. F. J.); Beauparc, co. Meath (H. C.).

A. dorsalis, Mull.—Donegal, Antrim, Down, Armagh, Louth, Dublin, Meath, Wicklow, Wexford, Cork.

A. albipes, F.—Donegal, Antrim, Down, Armagh, Cavan, Louth, Dublin, Meath, Wicklow, Wexford, Cork.

A. oblongus, Sturm.—Near Belfast (A. H. and R. P.); Armagh (W. F. J.); Lough Oughter, co. Cavan (J. N. H.); Courtown, co. Wexford (H. C.).

A. marginatus, L.—Donegal, Down, Armagh, Leitrim, Dublin, Louth, Meath, Wicklow, Wexford, Cork.

A. parumpunctatus, F.—Donegal, Down, Armagh, Tyrone, Louth, Cavan, Meath, Dublin, Wicklow, Wexford, Cork, Kerry, Great Arran Island.

A. gracilīpes, Duft.—Ardara, co. Donegal (W. F. J.).

A. atratus, Duft.—Ardara (W. F. J.); Garrolagh, co. Louth (H. C.).

A. viduus, Panz.—Near Belfast (A. H.); Armagh, shore of Lough Neagh at Maghery (W. F. J.); Lough Oughter, co. Cavan (J. N. H.); S. Louth, S. Dublin, Wexford (H. C.).

V. mœstus, Duft.—Near Belfast (A. H.).

A. micans, Nic.—Armagh (W. F. J.); Lough Oughter (J. N. H.); banks of R. Dodder, near Dublin (McN.); S. Dublin, Wicklow (H. C.).

A. fuliginosus, Panz.—Portballintrae (B. T.); Ballycastle, co. Antrim (E. C.); Cultra, co. Down (W. D.); Loughgilly, co. Armagh (H. L. J.); Portstewart, Armagh (W. F. J.); Ballyhaise, co. Cavan (J. N. H.); S. Dublin, S. Louth (H. C.).

A. gracilis, Gyll.—Ballycastle, co. Antrim (E. C.); Loughgilly (H. L. J.); Scotstown, co. Monaghan, Coolmore, Maghery, Lough Neagh, Armagh, Newtown Hamilton (W. F. J.); S. Louth, S. Dublin (H. C.).

A. piceus, L.—Scotstown, co. Monaghan; Maghery, Lough Neagh, Armagh, Loughgilly (W. F. J.); near Belfast (A. H.); Dublin district (McN. and H. C.).

A. thoreyi, Dej.—Armagh, Loughgilly (W. F. J.).

Cillenus lateralis, Sam.—Near Belfast (A. H.); Baldoyle, co. Dublin (McN.); Sutton, co. Dublin (J. N. H.); Tramore, co. Waterford (E. C.).

Bembidium rufescens, Guer.—Ballycastle, co. Antrim (E. C.); near

Belfast (J. B.); Cultra, co. Down (W. H. P.); R. Annalee, Ballyhaise, co. Cavan (J. N. H.); Coolmore, co. Donegal, Armagh (W. F. J.); Deansgrange, co. Dublin (H. C.).

B. QUINQUESTRIATUM, GYLL.—Near Belfast (A.H.); Armagh (W.F.J.); banks of Dodder, Dublin (McN.); Stillorgan, co. Dublin (H. C.).

B. OBTUSUM, STURM.—Armagh (W. F. J.); Lough Oughter, co. Cavan (J. N. H.); Dublin district (McN.); S. Louth, S. Dublin (H. C.).

B. GUTTULA, F.—S. Louth, S. Dublin, Wicklow, Wexford (H. C.).

B. MANNERHEIMI, SAHL.—Ardara, Coolmore, Armagh, Loughgilly (W. F. J.); Carngaver, co. Down (W. H. P.); Tullyesker, co. Louth (H. C.).

B. RIPARIUM, OL.—"Ireland" (S. M.); S. Louth, S. Dublin, Wexford (H. C.).

B. ÆNEUM, GERM.—Near Belfast (A. H); Benburb, co. Tyrone, Armagh (W. F. J.); Dublin district (McN.); Cork (M. B); S. Louth, S. Dublin (H. C.).

B. ASSIMILE, GYLL.— Near Belfast (A. H.); Skerries, co. Dublin (H. C.).

B. CLARKI, DAWS.—Coolmore, co. Donegal, Armagh (W. F. J.).

B. DORIS, PANZ.—Near Belfast (A. H.); Coney Island, Lough Neagh, Armagh (W. F. J.); Loughgilly, co. Armagh (H. L. J.); Dublin district (McN. and H. C.).

B. MINIMUM, F.—Near Belfast (A. H.).

B. NORMANNUM, DEJ.—Bundoran, co. Donegal (S. M.).

B. SCHUPPELI, DEJ.—" Ireland" (S. M.).

NOTES.

A short time ago we called attention to the issue of the first fasciculus of the Rev. W. Johnson's Lichen Herbarium, containing forty examples of the lichen flora of the three northernmost counties of England. The second fasciculus is now before us, and contains a well-representative collection of these minute plants, numbering forty specimens. Cladonia is illustrated by a further addition of six, Cladina, Ramalina, Cetraria, Platysma, and Parmelia each by three specimens, while Lecanora is represented by no less than ten examples. The work, when complete, will form a unique volume of the lichen-flora.

It is with pleasure we ask our readers' attention to the monograph of the land and freshwater mollusca of the British Isles, by J. W.

Taylor, F.L.S., the first part of which is now issued to subscribers. The aim of this work is to combine the information upon all the aspects of the study, and so form a standard work of reference as well as a reliable text-book upon British land and freshwater shells. The work will be complete in two volumes, the first of which will embrace, besides the general treatment of the subject, the morphology of the animals, &c., their geological and geographical distribution, habits, parasites, enemies, uses and development. The second volume will be devoted to the treatment of species individually, the various organisms will be described, observations on the habits and peculiarities of each species will be given, with a full list of localities and complete synonymy. The cost of each part is 5s.

LEPIDOPTERA.

Note on the Larvæ of Bombyx rubi (Fox Moth).—On Baildon Moor, near Bradford, the larvæ of *B. rubi* has been known to occur in the autumn months for about twenty years. Previous to 1874, we can bring no experience to bear upon the subject, neither can we find any records. In 1874, however, it occurred in the greatest profusion; one could scarcely walk without treading them underfoot, and even non-entomological pedestrians crossing the moor to Ilkley, a favourite holiday resort, often gave us glowing descriptions of the "extraordinary big caterpillars" they had seen. During the past session (September and October) it has occurred in equal abundance, and the remarks upon 1874 are just as applicable to 1894. In all the years intervening I have not had personal experience, but in the years in which I have observed it it has never been abundant—nor indeed what we may call very common. Mr. B. Illingworth, who has *visited the locality every year* since 1874, tells me that some years he has not been able to find any, and other years it has only been moderately common. What is the experience of other readers residing in localities where this species is regularly found? Such points as these, where there is an unbroken chain of observations, are of interest and value.—J. W. Carter, Manningham, Bradford, November 7th, 1894.

ORNITHOLOGY.

Richardson's Skua at Latchford.—A young specimen of the Richardson's Skua (*Larus parasiticus*), Linn., was shot on the 3rd October at the Latchford Locks, on the Ship Canal. This gull is a rare visitor to this locality, and the specimen has been placed in the hands of Mr. George Mounfield, for preservation. It will be added to the ornithological collection in the Warrington Museum.

THE DEVELOPMENT OF SOCIAL INSTINCTS.

BY A. J. JOLLEY.

(Continued from page 247.)

Passing to the Placental mammals, which are classified into thirteen orders, we find in the lowest of these, the Edentata, which includes the ant-eaters, sloths and armadilloes, as well as in the much higher order, Insectivora, *i.e.*, hedgehogs, moles, shrews, and the like, no social species ; the Edentates are too stupid, and the Insectivores too ferocious, for even the most rudimentary form of sociality to exist amongst them.

Amongst the numerous and widely-distributed species which constitute the order Rodentia, there is considerable diversity of structure, of habit, and of intelligence, and the development of the latter is in some species manifestly correlated with increased sociality. A high rate of reproduction, with a plentiful food supply and a generally suitable environment, leads in some cases to the aggregation of large numbers on small areas. Of this, the common rabbit supplies an illustration ; though, except so far as the presence of considerable numbers renders the unobserved approach of enemies more difficult, since one startled animal warns the others of the prospective danger, rabbits can scarcely be called social animals. Much the same holds of the South American vizcachas, whose numerous burrows render riding on the undermined surface of the Pampas a work of no little difficulty and danger. These South American rodents are, however, both more intelligent and more social than our rabbits ; they not only play together and warn one another of impending peril, but sometimes unite to resist their enemies. There is at least rudimentary sociality amongst many species of cavies, chinchillas, marmots, jerboas, voles, rats and mice, but the greatest development of the social instincts and the highest level of intelligence amongst the Rodents is found in the beavers, animals which date from the Miocene age, and which have had a very wide range in the northern hemisphere. Some beavers live in burrows with one end opening under water, and this may fairly be deemed the primitive type of beaver dwelling, from which the others have been developed. The storing of timber near the burrow (for the beaver is mainly a bark feeder) probably originated the idea of a dwelling-place into which the burrow might open on the land side ; from this to the oven-shaped lodge, built of strong timbers with interwoven twigs and grass and a thick coating of mud, the transition is not very difficult. The erection of such lodges on island, river-bank, or lake-shore, or rising out of some quiet shallow, evidences the intelligence of the builders, who adapt themselves to circumstances, and achieve their object of providing a comfortable dwelling which shall protect its occupants from the weather and from their carnivorous foes. Beavers also sometimes unite to construct dams, which, by raising the level of the water round their homes, give increased protection, and the skill with which these little animals—about a foot high and not much more than a yard long, including the tail—pile up large logs, stones, and mud is really marvellous. There can be little doubt that the improvement of the social instincts and of the general intelligence in this species are correlated ; those individuals, or at least the majority of those, which were not social would be eliminated by natural selection ; the social individuals on the other hand—and every increase in social sentiment and in skill in adapting themselves and their dwellings to local circumstances would accentuate this superiority—had only one other animal to fear, man. Before this competitor they are now disappearing, for he cannot afford to see valuable forests of timber trees destroyed and the climate of large tracts of country altered, even though the alternative be the destruction of the most social Rodent, and one of the most intelligent of all animals ; so he ruthlessly breaks down both lodge and dam, and the place which once knew the beaver knows it no more.

Passing to the order Ungulata, we find that the majority of the species live in herds; especially amongst the ruminants is this gregarious instinct well marked. The same deep-seated constitutional tendency manifests itself in both the muscular, nervous, and digestive systems of these animals. The power to eat rapidly large quantities of vegetable food, which can be subsequently re-gurgitated and chewed at leisure ; the tendency to seek safety in speedy flight rather than by attempting to resist attack, and the habit of living in flocks whose individuals warn one another of a common peril, and in the last resource often unite to resist a common enemy, are characteristic features of the Ruminants. Since polygamy is common amongst them, it may well be that the polygamous family is the primitive social unit amongst these animals ; but it is impossible to be certain on this point, for some live in pairs, and the gregarious instinct may in some cases have had its origin from rapid multiplication of individuals on areas yielding abundant food, and from the subsequent union of such individuals to resist beasts of prey, to whom stragglers fell easy victims. Natural selection would foster the gregarious instinct amongst such animals, whatever the nature of their sexual unions, whether promiscuous, polygamous, or monogamous.

Gregariousness is, however, at best a very low form of sociality, nor can much be said in favour of either the intelligence or the sociability of many ruminants, which in suitable localities occur in immense droves. Several species of South African antelopes formerly occurred in immense numbers, yet though many of them are beautiful they are mostly rather stupid animals. The llamas of South America and the giraffes of Africa live in herds, but are by no means intelligent creatures.

(To be continued.)

REVIEWS.

"Les Pécheries et les Poissons de la Méditerranée," par Paul Gourret; docteur ès sciences, sous-directeur de la station zoologique de Marseille. 1 vol. in-16 de 360 p., avec 109 figures, cartonné (*Bibliothèque des Connaissiancés utiles*). J. B. Baillière et fils, Paris.

Students of Natural History would do well not to confine themselves to the investigation of pure science alone, but walk abroad somewhat into the region of applied zoology, and develop some of those practical questions appertaining thereto. Amongst the numerous subjects this deviation from the main track of pure science introduces us to, perhaps none is more interesting, as bearing on the food question, than fish culture. M. Gourret, of the Zoological Station at Marseilles, has published a small handbook dealing with the coast fisheries of the Mediterranean, and which is illustrated by numerous original drawings. The work is divided into five sections: in the first the author discusses, marks out, and limits the localities of the fishing industry, treating also of the geological structure and features of the coast line, the nature of and variation in the waters, the alterations in depth, and the effects brought about by wind influences and the variation of currents, concluding the section by giving a scientific resumé on the habits of the local and sedentary fishes, and the various migratory species. The second part deals with the various appliances used in this industry,and the different methods adopted,*i.e.*, line-fishing, basket and pot-fishing, harpooning, torch light attraction, deep-sea fishing, and the various methods of trawling. The detrimental effects to which the fish fauna is subject, arising from the alteration of coast line, river deposits, &c., and voracious enemies, constitute the third part of the work, and complete the list of those distinct influences more or less direct which affect the fishing industry. Those protective measures, regarded as necessary for the revival of the littoral waters to their original state of prosperity, are fully discussed in the fourth part. The fifth and concluding section of the work is set aside to a list of those fishes frequenting the waters of the Gulf of Marseilles and neighbouring localities, with the scientific and popular names. A short dissertation on the frequency and rarity of the various species and the methods adopted for capture brings this useful work to a close. Numerous woodcuts specially drawn from nature embellish the book, and add greatly to the interest of the subject treated of, which, while being a study of practical utility, is nevertheless one which forms attractive reading.

"A Monograph of the Land and Freshwater Mollusca of the British Isles" (by John W. Taylor, F.L.S.).

The first part of this long-promised work is at last in the hands of the subscribers. This part, one of the four which will form the first volume, treats of classification, nomenclature, and the structure of various forms and varieties of shells. Its 138 figures are drawn with remarkable clearness and fidelity to nature, each being, in fact, a good example of the form described. Of the coloured plate which accompanies the part it would be difficult to speak too highly. The clearness and accuracy of the drawing are all that could be desired, and the colouring is true to nature. This will undoubtedly become t favourite text-book of the student of the British non-marine mollusca.—W. A. Gain.

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Angling Notes. A Day on the River Gowy. W. H. J. Jenkins, Esq.
Microscopical Notes from Note Book.

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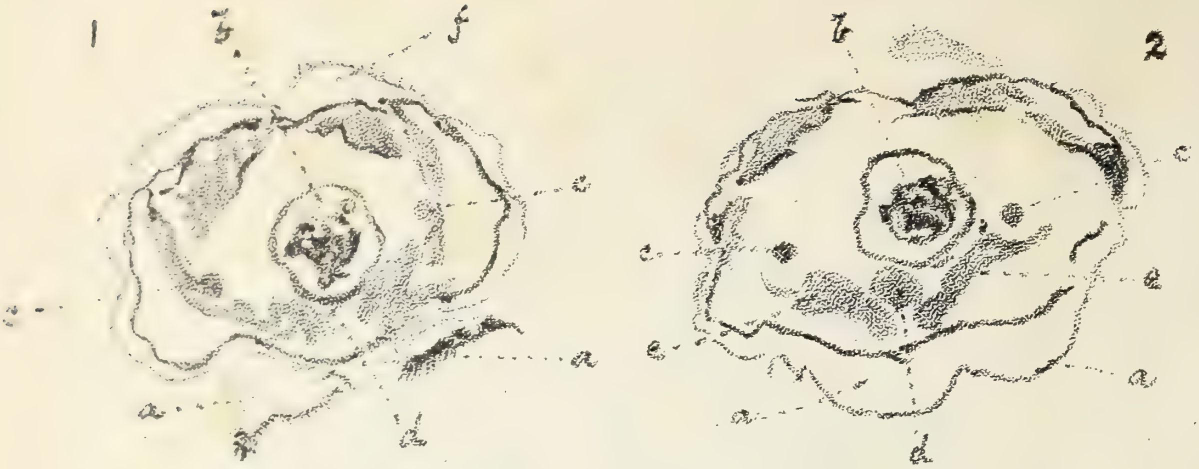
PLATE XII.



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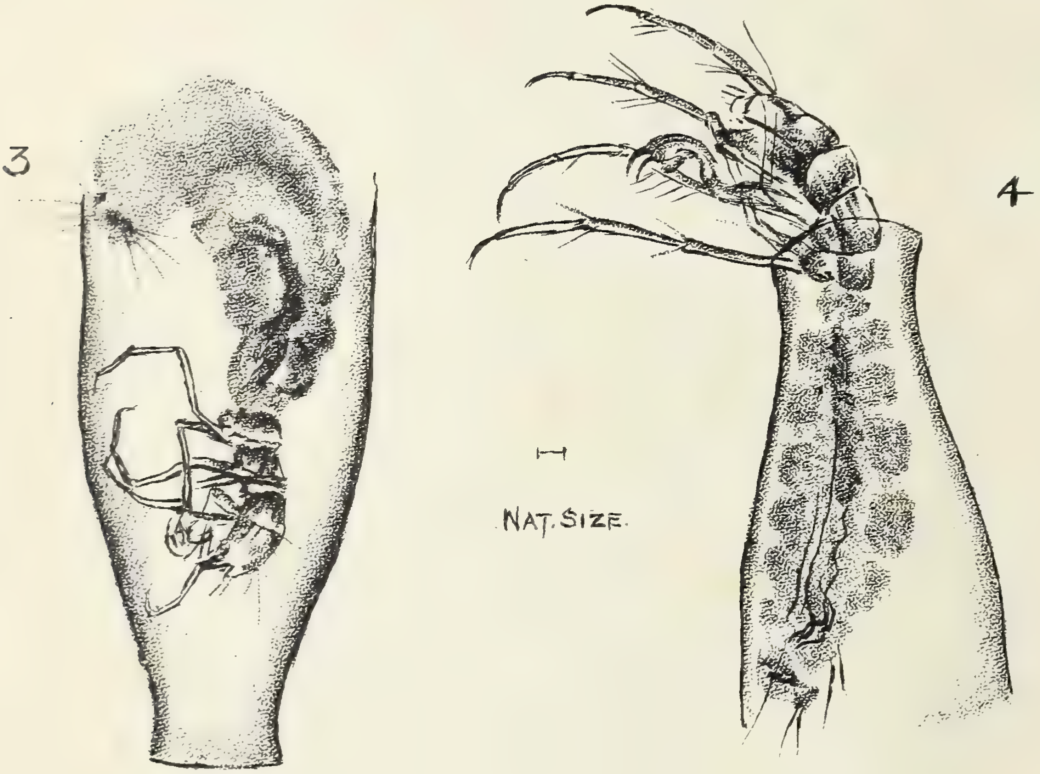

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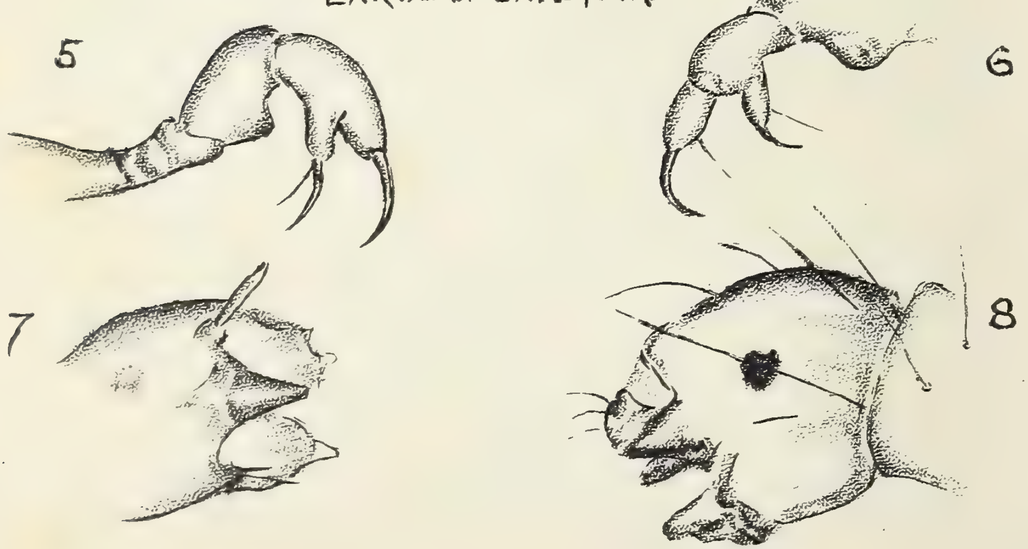

THE BRITISH NATURALIST.

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SOME CURIOUS AQUATIC LARVÆ.

BY GEORGE SWAINSON, F.L.S.

(Continued from page 256.)

Since the preceding notes were in the printer's hands, my friend Dr. Bousfield, of London, has cut for me serial sections of *Dixa* longitudinally, which have satisfied me that the rotatory tufts, ordinarily speaking, are on the top of the head; but the habits of the larva are so abnormal that the mouth opens, and the tusks are inclined, and the eyes are placed as if the tufts were in the lower jaw. If the head were placed as in ordinary larvæ, the long bristles on the underside of the first segment of the body would not only interfere with the rotatory action of the tufts, but would hinder food entering the mouth. Their action really is, as Meinert says, to keep the head clear of the side of

---

EXPLANATION OF PLATE XII.

Fig. 1. & 2.—Transverse sections of *Dixa* Larva—
  a. Pseudopods, showing in Fig. 1. hooklets.
  b. Intestinal canal with undigested food.
  c. Trachea much branched running on either side of intestine.
  d. Ventral nerve cord under intestine.
  e. Muscles of false feet.
  f. Dorsal skin showing minute hairs.
Fig. 3.—Marine form of *Trichoptera* in transparent capsule.—(Nov Spec., G.S.)
Fig. 4.—*Oxyethira* larva from Loch Tay.
Fig. 5.—Claw of marine larva.
Fig. 6.— Do. Loch Tay larva.
Fig. 7.—Head and jaw of marine larva.
Fig. 8.— Do. Loch Tay larva.

the pond or water-plant to which it is anchored by the suction-like action of the false feet, and thus acting as buffers, to allow the rotatory tufts free play in the water, especially if there should be a slight ripple thereon.

I now come to the point where I am certain both Stœger and Meinert are in error. At all events the remarkable difference between their observations and descriptions and those of De Geer and De Reaumur, fully confirmed by myself after long and careful observation and experiment, would lead one to think that the habits of *Dixa nigra* which Stœger examined differ radically in one respect from our species, which I think will probably turn out to be *Dixa amphibia*. Translating from his French resumé, Meinert says "The larva holds on by its false feet and its rows of bristles fixed to the upper parts of the plants rising above the water, but having its head and the extremity of its abdomen resting on the water in some such curved position as is represented in figure 103." Now I could have understood this exactly if the figure 103 had been drawn so, ∩ ; but in the plate the *Dixa* is shown with the body hanging down so, ∪ ; and this agrees with Stœger's statement in Danish, viz., "Lying on its back it is firmly attached to the water-surface by means of the suctorial organs of the tail and the pair of suction valves (false feet) in such a manner that the part of the body being in between will hang downwards in the form of an arc."

All I can say is that *this was not so* in any of the specimens I have examined—the animal always withdrew its body clear from the water, the bend going first, so graphically described by De Reaumur. I tried the experiment of withdrawing the piece of valisneria to which the larva was adhering, and quickly replacing it in the water with the body downwards; it always immediately moved itself round until its head and tail once more touched the water, with the body out, though surrounded by plenty of moisture.

The tail of the *Dixa* larva deserves our next attention, for it is a very complex organ, differing largely from all other Dipterous larvæ, but presenting resemblances to the pupa of Chironomus and other Diptera, especially in their hairy tail-plates, and, as Mr. Hammond says, "this fact is curious and suggestive." The tail is affixed to the 11th segment, and at its origin it has on each side a small brown papilla armed with bristles; next there two lobes or elongated protuberances, directed outwards, and bordered with bristles of the same length, as if cut with scissors. These horny fringed plates serve as floats to enable the larva to keep its tail on the surface, and not to allow the pair of stigmata to be submerged when the water is ruffled. The latter are well shown in the tail enlargement in Plate XI. These "suctorial organs," as Stœger calls these spiracles, are crescentic in shape, and are used partly as feet, possessing similar hooklets to the pseudopods on the 4th and 5th segments. The tail proper ends with a long conical brown tube, enlarged at the end with a point, and narrowed towards the middle, and terminating in 6 long, strong bristles.

The body is covered with minute hairs, plates, or specs, which are very distinct on the tail portion, and the 11th segment has a curious branching, branchial filament.

De Geer says the pupa lies on the top of the water for only four days, and then rapidly changes into a small, slender, black midge, with two long thread-like antennæ, thin, erect, and hairy. The balancers are club-shaped, and are rather long and flat. The wings are white and transparent, with very small hairs on all the nervules.

On the top of Plate XII. I give, as promised, two transverse sections of this *Dixa* larva, cut by Professor Miall, F.R.S., showing the ventral nerve-cord "*d*" under the intestinal canal, while beneath are the hooklets of the false feet. A finely branched trachea runs on either side of the intestine, shown at "*c*" in Figs. 1 and 2.

Marine Form of Larval Trichoptera.

We now come to the last of my curious Aquatic Larvæ. This was found in the open sea, off the mouth of the Ribble. There was a pretty strong tide running up the estuary, and I was fishing with my bottle and surface net off the end of St. Anne's Pier. Amongst my captures was a curious lively little creature in a very transparent capsule or case, not more than one-eighth of an inch in length. At first I thought it was a minute form of crustacean, as some of the amphipods construct cases or cells, and it was evidently quite at home in its salt-water quarters. Its abdomen very much resembled a small hermit-crab's, being swollen, nearly transparent, and very slightly segmented. But when I had killed and mounted my little treasure, I feared that its limbs, though arthropod, were not crustacean; and so the puzzle went on, for at that time I was quite ignorant that any marine caddis worms were known. I sent photographs of my micro mount in several directions, as it appears in Fig. 3, Plate XII., and at last one of the assistants of Professor Herdman, F.R.S., of Liverpool, thought it resembled some fresh water larvæ which his father, Mr. Thos. Scott, F.L S., had found in Loch Tay, and some of these he promised to send me. These, when mounted, immediately gave me the key to the puzzle; for while their likeness to my specimen was very marked in respect to the head and the three pairs of legs, the segments of the abdomen were now so plainly seen that "caddis fly larva" occured at once to my mind. Plate XII., Fig. 4.

But whoever heard of a pelagic caddis worm? and yet the tidal current was running from the open sea. The only conclusion I can come to is, that my specimen was hatched in brackish water, near the mouth of the river Ribble, and being carried out to sea, was able to outlive its full briny bath, and return with the incoming tide. I am confirmed in this idea by the Rev. A. E. Eaton, M.A., who tells me that species of Trichoptera have been found in tidal pools, on the coast of New Zealand, and that he himself found plenty of small Hydroptilidæ, to which family no doubt both species (Figs. 3 and 4) belong, in some salt or brackish streams in Southern Algeria, on the borders of the Sahara Desert. Mr. Eaton also drew my attention to Mr. Kenneth J. Morton's interesting account of the metamorphoses of *Oxyethira costalis* in the *Entomological Monthly Magazine* for February, 1887. The latter gentleman kindly sent me a photograph of one of his specimens, and ultimately I sent him both the marine and Loch Tay mounts for his examination. In reply, he expressed the opinion that both specimens (Figs. 3 and 4) belong to *Oxyethira;* but that the transparent case of my marine specimen differs from *O. costalis* in the anterior opening not having so distinct an everted rim, and, further, that the posterior margin is rounded, whereas in *O. costalis* this margin is always more or less truncate; but these cases, he says, can probably be made and altered or enlarged with considerable rapidity.

I have, therefore, in Plate XII. given, in more highly magnified detail, the difference in structure between the two larvæ, especially of the head and claw, Figs. 5 to 8. You will see there is a specific difference in the upper claw. In Fig. 6 this works separately. Then, both the head and legs of the Loch Tay specimen Figs. 4 and 8, are much more covered with hair than my marine specimen, Figs. 3 and 7.

Mr. Morton thinks the presence of my specimen in the open sea was an accident; for he says: "Many *Trichoptera* are found in tidal rivers near enough the sea to be slightly brackish, and I have seen cases taken from a streamlet at a place which at high water was covered by the tide. It might be worth while to keep a look out on the wood or iron work of the pier early in June for the perfect insect, which, though rather minute, is an intensely active and very hairy fly."

I must get my friends of the Preston Scientific Society to hunt along the streamlets running into the Ribble Estuary for some of these caddis larvæ or their cases, and try to rear them as Mr. Morton has done with *Oxyethira costalis.*

The Hydroptilidæ are all very small, and some of them fix and weave round their cases a secretion of fine silk threads. Diatoms are often found adhering both to the webs and the capsules. The wedge-shaped character of the case in *O. costalis* is very distinct; mine is more vase-shaped. The heads in both larvæ are much alike, with dark chitinous cephalothorax and distinctly marked segments, provided with the usual three pairs of legs, the first of which possess strong claws, but are not so lengthy as the two hinder pair of legs. The mandibles are short and rudimentary; the eyes are very distinct. The larva was very active, turning round easily and occasionally clinging with the two hooks at the end of the abdomen, more than half way out of the case, which you see is open at both ends.

Naturalists owe a debt of gratitude to R. McLachlan, Esq., F.R.S., for his excellent and painstaking "Monograph of the Trichoptera," and I can only hope that what he has done for the caddis flies, and the Rev. A. E. Eaton, F.E.S., for the equally-interesting "May flies," some one will attempt for the sadly-neglected Chironomidæ, Dixæ, and other Dipterous Flies. I hope I have added my little quota, which is the most that can be expected from a few hours of leisure taken from a busy official life.

A CATALOGUE OF IRISH COLEOPTERA.

BY REV. W. F. JOHNSON, M.A., F.E.S.

(Continued from page 270.)

B. LAMPROS, HERBST.—Donegal, Antrim, Down, Tyrone, Armagh, Louth, Dublin, Cork, Wicklow, Wexford.

B. TIBIALE, DUFT.—Banks of R. Cusher, Tanderagee, co. Armagh (W. F. J.); Dodder Banks (McN.); near Dublin (Dr. P.); S. Dublin (H. C.); Bray, co. Wicklow (Champion and J. N. H.).

B. ATROCŒRULEUM, STEPH.—Cushendun, co. Antrim (S. B.); near Belfast (A. H.); Ardara, co. Donegal, Clay Lake Keady, co. Armagh, Armagh (W. F. J.); Mornington, co. Meath, Royal Canal, Dublin, Bray, co. Wicklow (J. N. H.)

B. DECORUM, PANZ.—Cushendun, co. Antrim (S.B.); Near Belfast (A. H.); Dodder Banks (Mc N.); near Dublin (Dr. P.); Glendalough, co. Wicklow, S. Dublin, S. Louth (H. C.); Bray co. Wicklow (Champion); Mornington, co. Meath, Bray, co. Wicklow (J. N. H.).

B. NITIDULUM, MARSH.—Coolmore, co. Donegal (W. F. J.)

B. AFFINE, STEPH.—Armagh (W. F. J.); S. Louth, Courtown, co. Wexford (H. C.); Bray, co. Wicklow (Champion.).

B. QUADRIGUTTATUM, F.—Near Belfast (R. P.); "Ireland" (S.M.)

B. CONCINNUM, STEPH.—Mouth of R. Dodder (Mc N.); estuary of the Shannon, near Limerick (J. W.).

B. FEMORATUM, STURM.—Coolmore, co. Donegal, shore of Lough

Neagh at Maghery (W. F. J.); near Belfast (A. H. and R. T.); Killiney, Kingstown, co. Dublin (McN.); S. Dublin, Courtown, co. Wexford (H. C.).

B. bruxellense, Wesm.—Armagh, Loughgilly, near Newtown Hamilton (W. F. J.); Lough Oughter, co. Cavan (J. N. H.); Dublin district (McN.).

B. saxatile, Gyll.—Coolmore (W. F. J.); banks of Dodder near Dublin (McN.); Friarstown, co. Dublin (H. C.); Bray, co. Wicklow; Kilkeel, co. Down (Champion).

B. littorale, Ol.—Donegal, Antrim, Down, Armagh, Cavan, Louth, Dublin, Wicklow, Wexford, Cork.

B. pallidipenne, Ill.—Ardara, Coolmore, co. Donegal (W. F. J.); near Belfast (A. H.); Baldoyle (McN.); Killarney.

B. bipunctatum, L.—Cushendun, co. Antrim (S. B.); near Belfast (A. H.); Ardara, Lowry's Lough, Armagh, Maghery, Lough Neagh (W. F. J.); Portmarnock (McN.); S. Dublin (H. C.).

B. punctulatum, Drap.—Cushendun, co. Antrim (S. B.); near Belfast (A. H.); Clay Lake Keady, co. Armagh (W. F. J.); Loughlistown and banks of Dodder, co. Dublin (McN.); Friarstown, co. Dublin (H. C.); Bray, co. Wicklow (Champion and J. N. H.).

B. flammulatum, Clairv.—Armagh (W. F. J.).

B. varium, Ol.—Banks of Liffey at Celbridge, co. Dublin (McN.); Newcastle Bog, co. Wicklow (H. C.).

Tachypus flavipes, L.—Killiney beach (McN.); Shanganah, co. Dublin; Bray, co. Wicklow (H.C.).

Aepus marinus, Strom.—North Bull, near Dublin (McN.); Strangford Lough (Fowler, Brit. Col.); Clogher Head, co. Louth (H. C.).

A. robinii, Lab.—Owenbeg River, Cork Harbour (A. H.); Dingle, co. Kerry (Dr. S.)

Trechus micros, Herbst.—Armagh (W. F. J.).

T. lapidosus, Daws.—Holywood, co. Down (A. H.); Killiney beach (McN.); Coolmore, co. Donegal, Bellurgan, co. Louth (W. F. J.); in each case only a single specimen was taken.

T. rubens, F.—Ardara, co. Donegal (W. F. J.); Clontarf, Killiney, co. Dublin (McN.); Shankhill, co. Dublin (H. C.).

T. minutus, F.—Donegal, Antrim, Down, Armagh, Louth, Dublin, Wicklow, Wexford, Cork.

V. obtusus, Er.—Armagh (W. F. J.); Dublin Mountains (H. C.).

PATROBUS EXCAVATUS, PAYK.—Horn Head, co. Donegal (R. T.); near Belfast (A. H.); Rosetrevor Mt., co. Down, under stones (R. P.); near Dublin (McN.); Dublin Mts. (H. C.).

P. ASSIMILIS, CHAUD.—Newcastle, co. Down (Champion).

POGONUS LITTORALIS, DUFT,—Boyne Estuary (H. C.); Malahide, co. Dublin (Dr. S.).

P. CHALCEUS, MARSH.—Carlingford (W. F. J.); Clogher Head, co. Louth (H. C.); Baldoyle and Portrayne, co. Dublin (McN.); Mornington, co. Meath (J. N. H.).

CYMINDIS VAPORARIORUM, L.—Donegal (J. W.).

LEBIA CHLOROCEPHALA, HOFF.—Lough Swilly, co. Donegal (D. C.); "Ireland" (A. H.)

DEMETRIAS UNIPUNCTATUS, GERM.—Tower Bridge Nursery, Cork (H. C.).

D. ATRICAPILLUS, L.—S. Dublin, Wicklow, Wexford, Cork (H.C.); Killiney and Portmarnock (McN.); Cork (M. B.); Mornington co. Meath (R. S.).

DROMIUS LINEARIS, OL.—Donegal, Antrim, Down, Armagh, Louth, Dublin, Wexford, Cork.

D. AGILIS, F.—Near Dublin (McN.); S. Dublin (H. C.).

D. MERIDIONALIS, DEJ.—Near Belfast (A. H.); Armagh (W. F. J.); Howth (E. C.); Sandyford, co. Dublin (H. C.); Cherrywood Loughlinstown (McN.)

D. QUADRIMACULATUS, L.—Near Belfast (A. H.); Armagh (W. F. J.); Dublin district (McN.); S. Dublin (H. C.); Ballyhaise, co. Cavan (J. N. H.); Killarney (G. C.).

D. QUADRINOTATUS, PANZ.—Armagh (W. F. J.); S. Dublin (H. C.).

D. MELANOCEPHALUS, DEJ.—Near Belfast (A. H.); Armagh (W. F. J.); Cavan (J. N. H.); Howth (E. C.); Portmarnock (McN.); banks of River Tolka, near Dublin (S. M.); S. Dublin; Celbridge, co. Kildare (H. C.).

D. NIGRIVENTRIS, THOMS.—Portballintrae, co. Antrim (B. T.); Killiney and Portmarnock, co. Dublin (McN.); S. Dublin, S. Louth, Poulaphouca, co. Kildare (H. C.).

METABLETUS FOVEOLA, GYLL.—Portmarnock (McN.); Maiden Tower, Boyne Mouth, co. Meath (H. C.).

M. TRUNCATELLUS, L.—Portmarnock (McN.).

BRACHINUS CREPITANS, L.—Louth, Wexford (Fowler, Brit. Col.).

PART III.

Systematic List of GENERA and SPECIES with Synonyms of the latter.

BY THE REV. F. O. PICKARD-CAMBRIDGE, M.A.

(Continued from page 263.)

Dictynidæ **Dipneumones**

(Continued.)

Dictyna, SUND, 1770.

VIRIDISSIMA, *WLK. 1802.*	
Dictyna viridissima,	CB. Spid. Dor., vol. ii., p 589.
„ „	Sim. Les. A. de Fr., vol. i. p. 183.
LATENS, *FABR. 1775.*	
Dictyna latens,	CB. Spid Dor., vol. 1. p. 50.
Ergatis „	BL. Spid. Gt. Bt. Ir., p. 149, Pl. ix., 95.
Dictyna „	Sim. Les. A. de Fr., vol. i., p. 194.
ARUNDINACEA, *LINN. 1758.*	
Dictyna arundinacea,	CB. Spid. Dor., vol. i., p. 49, Pl. vi., 5.
Ergatis benigna,	BL. Spid. Gt. Bt. Ir., p. 146, Pl. ix., 93.
Dictyna arundinacea,	Sim. Les. A. de Fr., vol. i., p. 191.
UNCINATA, *THOR. 1856.*	
Dictyna uncinata	CB. Spid. Dor., vol. i., p. 50.
Ergatis arborea,	CB. Zoologist, 1862, p. 7960.
Dictyna uncinata,	Sim. Les. A. de Fr., vol., i., p. 186.
PUSILLA, *THOR. 1856.*	
Dictyna pusilla,	CB. Spid. Dor., vol. ii., p. 426.
„ „	Sim. Les. A. de Fr., vol. i.. p. 187.

FAMS.: SUB. FAMS.	GENERA.	PUBLICATION.
Dictynidæ (*Continued.*)		**Dipneumones**
Protadia, SIM, *1892*.		
	SUBNIGER, *C.B. 1861.*	
	Lethia subniger,	CB. Spid Dor., vol. ii., p. 467.
	Drassus ,,	CB. A.M.N.H., 1861.
	,, ,,	CB. T.L.S., xxviii., p. 439. Pl. xxxiii., 3
	Ciniflo mengii	CB. T.L.S., xxviii., p. 441, Pl. xxxiii., 7.
	Lethia ,,	CB. Spid. Dor., vol. i., p. 52.
	,, *puta,*	CB. Spid. Dor., vol. i., p. 53.
	Ciniflo puta	CB. Zoologist, 1863, p. 8570.
	,, ,,	CB. T.L.S., xxviii . p. 440.
	Lethia albispiraculis,	CB. Spid. Dor., vol. i. p. 53.
	,, ,,	CB. A.M.N.H., 5, . , p. 109, Pl. xi., 1.
	,, *puta,*	Sim. Les. A. de Fr , vol. i. p. 204.
Lathys, SIM. *1884.*	PATULA, *SIM. 1874.*	
	Lethia patula,	CB. Spid. Dor, vol. ii., p. 470.
	,, ,,	CB. A.M.N.H., 5, p. 108.
	Dictyna ,,	Sim. Les. A. de Fr. vol. i., p. 197.
	HUMILIS, *BLK. 1854.*	
	Lethia humilis,	CB. Spid. Dor., vol. i., p 51.
	Ciniflo ,,	BL. Spid. Gt. Bt. Ir., p. 145, Pl. ix., 92.
	Lethia ,,	Sim. Les A. de Fr,, vol. i., p. 201.
Altella, SIM. *1884.*		
	SPINIGERA, *C.B. 1880.*	
	Lethia spinigera	CB. Spid. Dor. vol. ii. p 468,
	Amphissa ,,	CB. A.M,N.H., 5, ix., p 3, Pl. i., 1.

(*To be continued.*)

THE DEVELOPMENT OF SOCIAL INSTINCTS.

BY A. J. JOLLEY.

(Continued from page 274.)

The wild sheep, of which species are found in North Africa, the Mediterranean Islands, and amongst the mountains of both Asia and North America, are eminently social and intelligent animals; they are lively and spirited, and the adult males are very courageous.

The chase of the kashkar of Central Asia or of the arni of the Atlas Mountains is full of difficulty and danger; an arni ram will attack a man without hesitation. Domestication and artificial selection have doubtless improved the wool and the mutton, but they have also lowered the intelligence of the sheep. A similar consequence, though in a less pronounced degree, has ensued from the domestication of cattle; artificial protection has removed the necessity for courage and organization, and domestic breeds are more timid and less social and intelligent than their wild relatives. The bisons, which as wild cattle no longer exist, but which thirty years ago ranged in enormous herds over the North American prairies, combined to resist the attacks of carnivores, the cows and calves sheltering behind a line or within a circle of bulls, who presented a formidable front to the enemy. Similar tactics are adopted by other species of wild cattle, and as isolated individuals readily fall victims to their carnivorous foes, a moderate level of sociality is effectively maintained. Although there is somewhat less of sociability amongst the omnivorous swine than amongst the herbivorous ruminants, yet most of them live in herds; the boars have usually a formidable armament in their tusks; they support one another loyally, and have plenty of courage. The hideous wart-hogs of Central and Southern Africa are the least social of the swine, whilst on the other hand, the peccaries of America, which represent a different stock, and approximate in some anatomical respects to the ruminants, also resemble them in being eminently social; though small animals and not provided with tusks like their Old World relatives, they are very courageous, and as they live in large herds and support one another loyally in battle, they often succeed in driving off carnivores much bigger than themselves. In the remaining genus of even-toed Ungulates the necessity for combining against carnivores does not exist; their vast size and strength enable the hippopotami to defy any enemy not provided with artificial weapons; yet they are eminently social animals, and are described as sporting together in the evenings and bellowing with joy.

Amongst the odd-toed Ungulates, the equine family, which includes the wild horses of Asia, the wild asses of Asia and

Africa, quaggas and zebras, are all social animals. Though usually trusting to speedy flight, they in case of emergency boldly resist attack; the adults will form in a circle round the young, and with well-placed kicks discomfit most antagonists; when a herd is attacked by wolves the stallions also use their teeth, endeavouring to seize the foe by the nape of the neck, then lifting him up and dashing him to the ground preparatory to trampling him to death. It cannot be said that the general intelligence of the wild horses or their senses, save that of hearing, are acute, and it would appear that in this group sociality is principally maintained by the pressure of carnivorous enemies.

The somewhat distant cousins of the horses which constitute the rhinoceros family are all very large and powerful beasts; several of the species are of savage and solitary habits, but one African species (*Rhinoceros simus*) is of a more pacific temperament, and often grazes in large herds on the plains of South Central Africa.

In the order Hyracoidea, to which the cony of Scripture belongs, it and two other species live in large numbers in burrows amongst rocky ground. They are mostly gentle, cautious and timid creatures, the only benefit they derive from their gregarious habit being that which arises from the warning cries uttered by the first to perceive an approaching enemy, whereupon all seek shelter.

Both our modern species of Proboscideans, the Indian and African elephants, live in herds which are sometimes very numerous; in this they resemble their extinct relatives the mammoths. The elephants surpass their distant relatives the ruminants both in intelligence and in sociality, and it would seem that this latter quality has been developed rather as an expansion of family affection and sympathy from within than as a result of the attacks of carnivores from without, for these giants even singly have little to fear from the fiercest of the larger cats.

Amongst the marine herbivorous mammals which constitute the order Sirenia, the dugongs are gregarious; feeding in numerous herds on seaweeds, and sometimes migrating also in large numbers, they yet can scarcely be said to have risen to the social level. In this respect they are far surpassed by some of their distant relatives, the Cetaceans, which, though not very intelligent animals, yet in some species are distinctly social. The caaing whale, shoals of which are often stranded on the coasts of our northern islands, exhibits sympathy with, and affection for, its comrades; a wounded one is surrounded by others, which will not leave it even when themselves attacked, whilst the blind confidence with which the shoal follow their leaders is frequently fatal to them. These are peaceful animals. Nearly allied to them is another species equally social, but much more active, and of a ferocious disposition. The killer-whale, the tyrant of the northern seas, hunts in small packs seals, narwhals, and the true whales; no inhabitant of the sea is safe from them; their voracity is such that they sometimes choke themselves, and in their eagerness to pursue fish or seals they often get stranded and die.

Passing to the consideration of the order Carnivora, of which one group, the Pinnipedia, are essentially marine forms, we find that most of the species in this group live in large flocks: though the seals are intelligent animals, they are rather gregarious than social; suitability of locality may lead to the aggregation of immense numbers, but, though the females love and protect their young, social instincts scarcely exist except amongst the walruses, which not only live in herds, but loyally unite to resist attack. The cry of a harpooned walrus is promptly answered by his comrades, which will surround and attack the boat, whose occupants are placed in great jeopardy; and, if Esquimaux statements may so far be trusted, walruses sometimes unite to attack the polar bear.

Amongst terrestrial carnivores, though there is often a high degree of intelligence combined with acute senses, the predominant tendencies are individualistic rather than social, and many species lead solitary lives except for a very brief period at the pairing season. Amongst the cats this is especially the case, though the lion seems sometimes to live in permanent union with his mate—or even mates, for he is occasionally a polygamist—and it is said that two or three lions will join in attacking large animals, such as the Cape buffalo. Whether lions are really so far social as to hunt in packs is doubtful, but a competent observer, Francis Galton, has recorded the presence of three males and five females in a patch of brushwood less than 200 yards across. The lynxes, which are closely allied to the cats, certainly sometimes hunt in small bands, following the trail of their leader in Indian file.

Amongst the smaller members of the Bear group the South American coatis are decidedly social animals, whilst among Old World forms the stoats may be mentioned as sometimes combining to attack animals much larger than themselves. The hyænas, which with their immensely powerful jaws and teeth would be but for their cowardice amongst the most formidable carnivores, hunt at night in bands, and this aggressive sociality reaches its highest development in the remaining family of the carnivores, to which the dogs and foxes belong. The Canidæ are often divided into the wolves with round, and the foxes with vertical slit-like pupils, though there are intermediate species, as the black-backed jackal of South Africa with broadly oval pupils. It is, however, noteworthy that the foxes are solitary animals, living in pairs, and never hunting in packs, though an approximation to sociality is shown by the Arctic foxes, which sometimes live in troops of a dozen or more.

The wolves on the other hand often live in large packs, and are said to display not only great perseverance in the pursuit of prey, but not a little intelligence in cutting off its retreat. During part of the year wolves live solitary or in pairs ; when the young have been reared they again assemble in packs ; and it would appear that the social instincts of these animals have been developed from the family affections, and ultimately therefore from the sexual instincts. Sympathy, however, except between mother and suckling young is almost unknown amongst them ; comrades which may have been wounded in the attack on some other animal are relentlessly devoured, and the young would often be eaten by their fathers but for the mothers' protecting care. Cunning, cruelty and ferocity when acting in concert, cowardice when alone, are the results of the development of aggressive sociality amongst the Canidæ ; and with slight modifications this holds good for them throughout the world ; it applies equally to the dingoes of Australia, the jackals and lycaons of South Africa, and the wolves of Europe, Asia and America.

The absence of sociality amongst the Insectivora, most of which appear to suffer from chronic hunger, and are characterized by great ferocity, has been already referred to ; in the closely allied bats, which are essentially flying Insectivores, with very little intelligence, though large numbers are often found sleeping or hibernating together in suitable localities, it cannot be said that sociality, or even gregariousness, has arisen. Amongst the fruit-eating bats also the large numbers which occur together may fairly be attributed to favourable sleeping and feeding grounds, though perhaps in these species the gregarious level has been reached, for they fly as well as feed in large flocks. The single genus placed in the order Dermaptera may also be deemed to have acquired gregarious instincts.

The very heterogeneous order Lemuroidea includes a number of specialized forms, which are clearly the descendants of more central types, from which the ancestors of the apes emerged. All modern Lemuroid species are nocturnal animals of relatively low intelligence, and almost entirely arboreal in habit. Some of the species appear to be gregarious, and the indris of Madagascar, which are the largest as well as the most intelligent members of the order, sometimes occur in large numbers. The typical species (*Lichanotus indris*) is easily tamed, and in some parts of Madagascar is employed to catch birds for its owner.

Passing now to the last and highest order of mammals, to which we ourselves belong, and of which the American marmosets are perhaps the lowest members, we find that amongst the Platyrrhine apes, which are exclusively American, the tendency to live in troops is very pronounced, only a few species leading solitary lives or living in families. All are tree-dwellers, and only descend to drink or to traverse short spaces which they cannot otherwise cross. Since their principal enemies are large serpents and such cats as the jaguar, puma, and ocelot, which they cannot resist, the habit of living in troops can scarcely have been impressed upon them by dangers from without, but is more probably an extension of family affection.

The species of the genus Lagothrix are more courageous than any of the other Platyrrhine apes, and members of a troop help one another in time of danger ; but all the other species seek safety in flight.

The Sajous resemble some of their Old World cousins in the habit of occasionally descending in flocks to plunder fields or gardens in concert ; these are the most active of the American apes, all of which are rather gentle and peaceful animals, easily tamed, but rather dull and sluggish.

Their Old World cousins, the Catarrhine apes, are as a rule more imitative, mischievous, and restless ; they usually live in troops, display great affection for their young, and loyally support their comrades in the hour of danger. Though all modern forms are more or less specialized, it is reasonable to regard the tailed arboreal species as, on the whole, the most primitive. Many of the African species, which compose the genus Cercopithecus, live in troops of a hundred or more, and are heartily hated by the negroes, whose fields they plunder with boldness and skill. There can be no doubt that they communicate with one another by various cries, and they are said to act under the leadership of an old male when engaged on their plundering expeditions. The African apes of the genus Colobus and the Asiatic Semnopitheci do not greatly differ in habit or character from the Cercopitheci.

Another great division of the Catarrhine apes, the Macaques, illustrate the transition from arboreal to terrestrial life ; they usually live in troops of 30 or more, are as a rule stronger and more courageous animals than most of the tailed arboreal species, and though the old males are somewhat quarrelsome, they unite against a common foe. In this group, as amongst the baboons, there are both tailed and tailless forms ; the Barbary ape for instance, which inhabits the mountains of North Africa, is a tailless form, and has received its specific name on that account. In its general habits it resembles the baboons, which, with the exception of two Asiatic species, are an African group. The baboons are beyond doubt the ugliest and most formidable looking of the monkeys. As is the case with most Old World apes, the sexual instincts are very violent, and incredible lasciviousness is the common vice of the baboons. In other respects, their habits are eminently social ; they love and tend their young with great care. Living in great troops, which sometimes number several hundreds, occasional quarrels and fights are inevitable, but as a rule they live on very friendly terms, often playing and sporting together; in turning stones to search for insects and other small animals they unite to roll over those which are too large and heavy for one baboon to move; and in time of danger the females and young keep together, whilst the males boldly advance to attack the enemy. Their jaws are armed with formidable teeth, and their strength and courage enable them to defy even the leopard. As illustrating the height which social instincts may attain amongst baboons, an oft told tale of heroism will bear repeating once more. It comes to us on the authority of the great German naturalist Brehm, who spent five years in Africa, and on one occasion in Abyssinia saw a great troop of baboons crossing a valley; the dogs belonging to Brehm's party rushed to attack them, but quickly retreated before the advancing males; one young baboon, however, had straggled behind, and to escape the dogs clambered upon a rock, which was quickly surrounded. Its cries of distress were heard, and one of the old males returned down the mountain and gently led the young one back to its comrades, the dogs being apparently too much astonished to make a combined attack on the rescuer. This courageous animal was a hamadryad (*Cynocephalus hamadryas*); a kindred species (*C. gelada*), the geladas, resemble the hamadryads in living in large troops and being highly social. Between these species there is much hostility, and frequent battles take place between the troops. The common baboon, with its allies the Chacma and Guinea baboon, are somewhat smaller and less formidable looking animals, which rarely assemble in such large troops as do the maned species; three or four males, eight or ten females, and from a dozen to a score infants and half-grown young make up the average troop. Sometimes, however, in dry seasons the maneless baboons congregate in very large numbers near watercourses, but this is solely due to the limitation of the area in which food and water can be obtained, and such aggregations are not fairly comparable with the large troops in which the geladas and hamadryads normally live.

Widely separated from the baboons, since they have diverged from the central Catarrhine type in another direction, are the Anthropoid apes, of which there are about a dozen species grouped into three genera. Of these the lowest are the gibbons, gentle, peaceable animals, which inhabit the forests of the Malayan regions, where they occur in troops of 20 or 30. They are nearly allied to the Dryopitheci of the Miocene age, and represent more closely than any existing apes the Tertiary forms from which the higher apes and man have emerged. It seems probable that the Tertiary ancestor of the gorilla, chimpanzee, orang, and man resembled the modern gibbons, not only in his structure but in his habits, and was a social arboreal animal. Such of his descendants as acquired great size and strength no longer needed to be social as a protection against enemies, whilst the jealousy of the adult males would tend to establish solitary or family rather than social life. We accordingly find that the larger Anthropoids, which are well able to defend themselves, no longer live socially, the male living with his wife (or wives, for the gorilla is polygamous) and children; yet even here the social instincts inherited from less specialized ancestors have not entirely disappeared, for the chimpanzees sometimes assemble in pretty numerous troops, and are then said to play together in a very friendly manner.

Amongst the gibbon-like apes of the Miocene age were forms with less specialized arms, and, as a consequence, a less pronounced tendency to arboreal habits. A bigger and more complex brain was associated with the more frequent assumption of the erect attitude; greater intelligence enabled these creatures not only to use stones and sticks as missiles, as several species of apes do, but to use them as weapons, and to roughly shape them for that purpose. But the inability to escape rapidly from bough to bough like the more specialized gibbons, and the unsteadiness of gait inevitable in the first generations, which ceased to use the fore limbs as organs of progression, rendered these creatures, in spite of their rude weapons, peculiarly helpless in the presence of such enemies as the larger beasts of prey; and nothing but an increased development of those social instincts which were already possessed by their gibbon-like ancestors could have enabled them to survive the perils to which they were frequently exposed. The proposition that high intelligence is necessarily associated with great sociality cannot be maintained, for there are numerous instances of animals which, though endowed with considerable intelligence, are almost destitute of social instincts; but that increased intelligence arising in a species already social and exposed to constant perils, which the individuals can only overcome by united action, will result in increased sociality there can be no doubt.

During the Miocene age these awkward Anthropoids, whose shorter arms, smaller teeth, and weaker jaws were correlated with an increase of size and complexity in the brain, would have been speedily exterminated if they had not retained and carried to a higher development the habit of acting together against their enemies. Sympathy, not only for their own young, but for all the members of the community, was a necessity of existence, and those communities in which such sympathy was most highly developed, in which the members were most ready to subordinate their individual to the common welfare, would not only have the best chance of overcoming such enemies as the Carnivores, but would be able to successfully resist hostile troops or individuals of allied or even the same species. That hostile troops of apes sometimes engage in battle is well known; it may suffice to refer to the already quoted case of the geladas and hamadryads, two kindred species of baboons; that the Miocene Anthropoids engaged in similar hostilities is a reasonable supposition, and that in such struggles the more social species is likely to succeed there can be no question. When such animals ceased to be apes and became men is merely a question of definition. If we could see specimens of all the generations which have lived since the Miocene period, we should describe some of the earlier forms as apes and the later as men; but between these well-marked forms would be a long series of connecting generations which we might well hesitate to class in either group; nor should we need to name them either apes or men, since doing so would tend to obscure the essential continuity of the series, and might lead us to forget that the one group had grown out of the other. It is not less important that we should remember that so far as the internal tendencies, which being adapted to both its organization and environment have given rise by natural selection to a new species, can be called the cause of that species, so far the social instincts have been the main cause of the evolution of man from the ape.

The upward movement, however, was a very slow one. Before the discovery of fire, and until a considerable amount of skill in the manufacture as well as in the use of weapons and tools had been attained, those Anthropoids which had sufficient character to wish to live independently and to possess property (including under that head wife or wives) would be eliminated, since they would be unable single-handed to resist their carnivorous foes; and we can dimly realize that whilst external pressure maintained a certain degree of organization and intelligence amongst the social Anthropoids, yet that the pressure was so severe and of such a nature as to hinder rather than foster their higher development. Marriage, meaning thereby the union of a man with one or with several wives, or of a woman with one or with several husbands, was unknown amongst them, for the social instincts were not yet sufficiently strong to overcome the disruptive effects of jealousy; and disruption then meant extinction. It seems to be an irresistible conclusion that marriage arose and became established amongst the fierce and powerful ancestors of our gorillas and orangs, long before it was possible amongst the weaker and more intelligent social Anthropoids which formed the direct line of our human ancestry: that the ancestors of the gorillas lived in families of father, mother, and young, whilst our direct ancestors were still living promiscuously. It is then evident that the ennobling and elevating influence of parental affection was almost unknown amongst our Pliocene forefathers. That though the mother might love her suckling young, at a later stage of its growth it would be the child of the community rather than of the individual, and that whilst the males would extend to the young the same sympathy which they felt for all the members of the tribe, true paternal sentiment could not exist. One of the most powerful stimulants of man's higher nature was thus lacking, and may at least in part explain the slow evolution of the Pliocene Anthropoids.

During the succeeding ice age the area in which they could exist was much restricted, and for many thousands of years the climatic conditions of the earth were much less favourable to human development than they had been in Tertiary times; nevertheless, despite great changes in the fauna and flora, men survived till the end of the glacial epoch, and when that drew to a close, followed the retreating ice sheets and spread over such parts of the earth as could be inhabited by men ignorant of the use of metals, and whose most formidable weapons were rude flint-headed arrows. Sociality was still maintained by external pressure, nor need we doubt that palæolithic man retained a large amount of that imitativeness which is so characteristic of apes and children, yet, though this latter quality should have ensured the preservation of any useful invention, and thereby facilitated human advancement, the upward movement was extremely slow, and we may suspect that some retarding influence was at work. It seems probable that articulate language was, as yet, only slightly developed, and that not until definite speech had superseded vague cries and gestures was any further elevation possible. After the lapse of many centuries this characteristically human faculty was attained, and the method of polishing stone implements having also been discovered, Neolithic man occupied a position of indisputable pre-eminence in the animal kingdom. Unlike his Tertiary progenitors, who, with jagged tree branches or rough stones, had, even when acting in concert, scarcely maintained the struggle for existence with their pithecoid or carnivorous competitors, Neolithic man, armed with a sharp-cutting axe, a well-balanced spear and keen-tipped arrows, was able, single-handed, to hold his own against any other animal. Individualistic tendencies, which to his Tertiary or Palæolithic ancestors would have been fatal, could at length find free development, and the family, as we now understand it, became possible. The deep-seated social instincts which had been transmitted through thousands of generations were not, however, annihilated, but modified. Families, though able to exist apart, would often find it to their advantage to act and, sometimes, to live together—hence would spring one form of tribal organization. But such tribal organization would only be possible if there was a considerable amount of mutual forbearance amongst the members of its constituent families. Those individuals who did not care to practise such forbearance would leave, or be expelled from the tribe, and there would thus be instituted a rude moral code. Some faint foreshadowing of this had no doubt appeared at a much lower level amongst Palæolithic men, but it was only now that the social instinct which forbids injury to and stimulates to help of other members of the same community had risen to such a height and acquired such power as to be worthy of the name of conscience.

Whilst it is of course true that religious training has largely influenced what the modern Christian calls his conscience, and also probable that the conscience of Neolithic man was influenced by religious notions of a more or less rudimentary character, yet it is equally clear that, fundamentally, conscience springs from the social instincts, from that love of praise and dread of blame which are inevitably produced by social sympathy at all but the lowest levels of intelligence. It would be easy to illustrate this truth from the habits of many existing peoples, both savage and civilized, but it must suffice now to assert that love, sympathy, self-command, conscience, and the sense of duty have been evolved from lower social instincts, and are as purely the result of natural causes as any part of our physical organization.

Whilst, however, frankly recognising that the social instincts form the historical basis and starting point of ethical sentiment, I cannot share the opinion, which appears to have secured an increasing number of adherents, that the welfare of the species is both the cause and the standard of morality. Those who hold this opinion ignore, or at least minimize, important historical facts; but, as has been often said, "facts are stubborn things," they decline to suppress themselves in favour of any hypothesis, scientific or otherwise, and theories which are inconsistent with facts have sooner or later to be taken back for enlargement and repair. The pages of a natural history magazine are not the place for an essay on the evidences of Christianity, but had the case been otherwise, it would not have been difficult to show that belief in the Divine nature and mission of Him who was known to His contemporaries as Jesus of Nazareth is amply justified; and if that be so our whole attitude, both to evolution at large and to the part of it which has been dealt with in the preceding pages, must be widely different from what it would otherwise be.

For those who hold that its evidences are inadequate and who reject the Christian revelation, belief in the existence of God becomes "an immoral pretence," since no one who has any adequate conception of evolution can honestly accept the old natural theology argument from design: the belief that the welfare of the species is both the cause and the standard of morality seems to be a necessary corollary of this position. On the other hand, those who accept the Christian revelation necessarily regard the universe as a manifestation of the Divine will, of which another aspect was presented when at a fit stage in the history of humanity a more direct revelation of the Divine nature was offered to men and a new standard of morality set up. Some beliefs which had hitherto been mere guesses received confirmation, of which two have a special connection with our subject—the belief in God and in a future life. Both these doctrines had influenced ethical sentiment for centuries before they were authoritatively proclaimed by our Lord, and no study of the history of morality can be profitably carried on unless this fact is kept constantly in mind. It is probable that some faint conception of a future life was formed by Palæolithic man, and such a belief, whatever its origin and however erroneous it might be, could not fail to influence conduct. When after many generations the transition to the Neolithic civilization had been effected, and man's greater control over the powers of nature had materially restricted the extent to which natural selection controlled human development, the influence of religious belief on social organization and ethics became correspondingly greater.

Whilst, then, we recognize that sympathy for his fellows, in the possession of which man resembles all other social animals, forms the groundwork of morality, and is a direct result of social instincts, we see that the widening of that sympathy until it extends not merely to members of the same society but to the larger community of the nation, to other kindred nations, to all mankind, however diverse in habit or breed, and which finds further expression in kindness to the lower animals, has been mainly due to religion. This sentiment, which we usually, though not quite accurately, speak of as Humanity, is the highest stage yet reached in the upward movement which began millions of years ago amongst the primitive protists. From the lowly amœba which unconsciously shrinks fram danger to the saint who consciously shrinks from the commission of a moral offence, there is an immense distance, a distance, however, which has been traversed by slow degrees, the principal stages in the progress being visible enough, save to those who, "having eyes, see not."

In reviewing this progress we have seen that sociality has probably had two sources, that it has arisen under two kinds of circumstances. Sometimes it has been due mainly to the pressure of external dangers acting on organisms aggregated within a small area. Such pressure may have existed before the organisms had reached the conscious level. and as they passed upwards through the sub-conscious to a higher grade sympathy may have been the earliest sentiment manifested in the nascent consciousness of the species. On the other hand, in many cases sympathy appears to be an extension of family affection; the sexual instinct has given rise successively to love of mates, love of young, and at a much later stage to love of others outside the family.

It is not always possible to assign sociality as it exists in modern species to one or the other cause, for in the past history of that species both may have combined, since even in the most social species some disruptive tendencies exist and at times become powerful, making it probable enough that in the vast lapse of geological time many species might acquire one kind of sociality, subsequently losing it, and again acquiring the former or another type of sociality. Despite the fact that sociality has two kinds of origin, one principal cause has been of immense importance in sustaining and increasing both forms of it, viz., the pressure of external danger; this truth has already been several times referred to, and further illustration of it is needless.

Our necessarily brief sketch of the development of the social instincts is now ended. Whilst recognizing that the roots of the tree of sociality lie deep in the soil of sub-conscious animalism, we have not restricted ourselves to an examination of those lower structures, but have looked upwards and seen that it bears also the flowers of ethical sentiment, which, under the ripening influence of religion, yield the fruit of a pure and noble morality.

REPORTS OF SOCIETIES.

CITY OF LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY.

Tuesday, October 16th, 1894.

Mr. Battley exhibited a drawer containing most of his *Agrotidæ*; also colour photo-prints of *Vanessa atalanta*, *V. io*, and *Chelonia caia*, the likeness to the originals being extremely good. The plate was a supplement to a recent number of the magazine called "The Photogram."

Dr. Buckell, a female *Satyrus semale*, and a female *Epinephele ianira* captured at Folkestone Warren on September 2nd. Both were in perfect condition, and he raised the question as to whether the *ianira* was part of a second brood, or whether that species continued to emerge over a period of two months.

Mr. Prout, *Caradrina ambigua*, *Noctua c-nigrum*, and *Aporophyla australis* (with dark vars.), all from Sandown; also *Triphæna subsequa*, from Sandown and New Forest.

Mr. Bate, a specimen of *Arctia fuliginosa*, bred from a female taken on the last Sunday in June; the rest of the brood being still feeding.

Mr. Boden, a series of *Solenobia inconspicuella*.

Dr. Dudgeon, a female slow-worm (*Anguis fragilis*), and young one. The mother was captured at Herne Bay, and the young one was one of a brood of five; it was about five weeks old.

Mr. Clark, *Cossus ligniperda*, from Tottenham, and *Zeuzera pyrina*, London Fields.

Mr. Southey, *Xylophasia scolopacina* and preserved larvæ of the same; also ichneumons bred from some of them. All were from Highgate Woods.

Mr. Smith, *Zygæna trifolii*, from Broxbourne; *Nyssia hispidaria*, from Epping Forest; and *Asphalia ridens* and *Scodiona belgiaria*, from the New Forest.

Mr. Bacot, a series of *Bombyx trifolii*, sembled near Liverpool. He said that the species seemed somewhat nondescript, and not very closely allied to any of its congeners, most of which he exhibited with their preserved larvæ.

Mr. F. J. Robinson, of Brixton, a bred hermaphrodite specimen of *Crocallis elinguaria*, from the New Forest; the antennæ and wings on the right side were male, and on the left female.

Mr. Tutt, *Eulepia cribrum*, var. *candida*, taken by himself and Dr. Chapman near the foot of Mont Blanc. The specimen had the forewings greyish-white with very few black spots, mostly near the outer margin.

Captain Thompson, on behalf of Mr. Mutch, of Hornsey, a series of *Agrotis cursoria* from Morayshire, N.B. He also exhibited *Melitæa aurinia*, from co. Sligo, and *Agrotis vestigiali* , from Sligo and Pembrokeshire; also an unset series of *Dasypolia templi*, taken by Mr. E. Halliday, at light at Halifax, where that gentleman had found them common.

Mr. Bayne, *Hydrolia uncula*, *Tholomiges turfusalis*, *Hypenodes costæstrigalis*, and others, from the New Forest.

The Rev. C. R. N. Burrows, of Rainham, read a most instructive and amusing paper on the *Agrotidæ* and other lepidoptera taken during the season ot 1894, in his garden, mostly at sugar. With regard to the latter, he recommended methylated spirits instead of rum as having a superior attractive and anæsthetic effect. He exhibited two drawers of specimens to illustrate his paper; they included a very fine series of *Agrotis ravida*, and long series of *A. nigricans* and *exclamationis*, the former ranging from a pale smoky-yellow to nearly black, and the latter exhibiting some nice varieties with confluent stigmata.

Tuesday, 6th November, 1894.

Mr. Nicholson exhibited a series of 5 male and 4 female *Trichiura cratægi*, bred from larvæ beaten from blackthorn in Epping Forest.

Mr. Clark, a brownish specimen of *Vanessa urticæ*, from Tottenham.

Dr. Buckell, young larvæ of *Callimorpha hera*, about half-an-inch long. They were hatched on 21st August, and at first would only eat knotgrass, but when this failed they took to dandelion without much ado.

Mr. Tutt, a box containing *Rhopalocera*, from Aix, South Europe, including *Hipparchia briseis*, *H. dryas*, and *H. actea*, on which he read notes. He also read an interesting account of *Zygæna carniolica* and its vars., as obtained by him at Courmayeur, in Piedmont; and he exhibited specimens of the type and var. *berolinensis*, and others.

Mr. Bate, a fine banded form of *Oporabia dilutata*, and *Boarmia repandata*, var. *conversaria*, from the New Forest.

Mr. Bacot, *Colias electra* and var., from S. Africa, with *C. edusa* for comparison; the var. resembled *helice*, but was much more suffused with black; also 84 specimens of *Cerastis vaccinii*: they were very variable, seeing that the female parent, which he also showed, was unicolourous.

Mr. Southey, some very fine examples of *Acheta domestica*, the House Spider, one of which measured nearly five inches across, when the legs were expanded.

Dr. Buckell stated that Lord Dunmore, in his recent book of travels in Pamir, mentions that *Pyrameis cardui* was found at an elevation of 16,800 feet.

Dr. Sequeira read a poetical effusion in which he extolled the virtues of pure wood naphtha as a relaxing agent for insects; and Mr. Clark applied some to the bases of the wings of a specimen of *Spilosoma lubricipeda*, which in less than five minutes was quite sufficiently relaxed to allow of its being reset.

Tuesday, 20th November, 1894.

Mr. Battley exhibited *Anchocelis lunosa* and *A. pistacina*, showing the close resemblance between these species; the most evident difference in the specimens shown lay in the fact that in *lunosa* the subterminal line was made up of a series of ***black*** crescentic spots which in *pistacina* were of the same colour as the forewings.

Mr. Clark, *Tæniocampa munda*, var. *immaculata*, from Dorset; and two specimens of *T. gracilis*, from the New Forest, one of which was of a reddish colour and the other dark purplish brown.

Mr. Bacot, *Gortyna ochracea*, bred from burdock stems; two of the specimens had a light patch on one of the anterior wings, which Mr. Tutt considered had been caused by pressure on the pupa during development.

Mr. S. J. Bell, specimens of gum containing spiders, lepidoptera, and other insects.

Mr. Prout, *Orthosia lota* from Hale End and Sandown, the latter being mostly var. *rufa*.

Mr. Tutt, *Zygæna achilleæ*, and vars. from Courmayeur, Piedmont. This species exhibited variations which seemed to make it a connecting link between the five-spots, like *Trifolii*, and the blotched species like *Z. pilosellæ*. This was brought about by the extension of the upper basal red blotch along the costa. the union of the lower basal patch and lower central spot, and the union of the upper central and apical spots.

Mr. Battley gave a short account of a recent visit to Charmouth, Dorset, from which it appeared that though insects were scarce by reason of the unpropitious weather, 111 species of plants were noticed as actually in flower, including the primroses. cowslip, dog violet, privet, and wild strawberry. The principal insects taken on ivy were *Xylina petrificata* (1), *Epunda nigra* (5), *Orthosia maoilenta* and *lota*, mostly var. *rufa*, *Xylina rhizolitha* (few), *Cidaria siterata* (few); at light on November 5th, two specimens of *Dasypolia templi* were taken at Lyme Regis, and a specimen of *Pararge egeria* was seen on October 25th.

Annual Meeting, Tuesday, 4th December, 1894.

Mr. Battley exhibited *Xylina petrificata*, *Dasypolia templi*, *Epunda nigra*, *Orthosia lota* and *macilenta*, and *Cidaria siterata* (*psittacata*), from Charmouth, Dorset.

Dr. Sequeira, *Hydrocampa nympasalis* and *stagnalis*, *Spilodes palealis*, and *Paraponyx stratiotalis*, all from Folkestone.

Mr. Prout, *Noctua plecta* and var. *andersoni*, *N. glareosa* and var. *rosea* and *N. rubi*, and var. without transverse lines, all from Sandown, I.W.

Mr. Bate, two specimens of *Danais chrysippus* which had been set after being relaxed with wood naphtha spirit; the result appeared quite satisfactory.

Mr. Taylor, a series of *Orthosia suspecta* from Wimbledon, and a specimen of *Xanthia ocellaris* taken in the same locality; only some half-dozen specimens have been previously recorded for this country.

Mr. Clark, two good species captured by Mr. E. Anderson, at Melbourne, viz., *Hypochrysops delicia* (a butterfly); and *Selidosema lyciaria*, a beautiful moth, seemingly more nearly allied to *Boarmia* than to *Selidosema*.

The Election of Officers for 1895 having been accomplished, and the Treasurer's and Secretaries' Reports having been read, Mr. Tutt, at the President's invitation, read a paper on "Entomologists and Entomology," instead of the usual President's address.

Votes of thanks were given to Mr. Tutt for his address, the retiring officers, and the Auditors.—C. NICHOLSON and A. U. BATTLEY, Hon. Secretaries.

THE SOUTH LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY.

Thursday, November 8th, E. Step, Esq., President, in the chair.

Mr. R. South exhibited a large number of species of Lepidoptera, representing his captures of the season, and stated that it was the most barren year he had ever experienced. Among the specimens were a bred series of *Cidaria truncata*, Hufn., var. *centum notata*, Fab., a unicolourous *Hepialus velleda*, Hb., and a series of *Crambus margaritellus*, Hb.

Mr. Frohawk, bred specimens of *Vanessa atalanta*, L., with an incipient white blotch in the red band ; and a pale *Thecla rubi*, L.

Mr. H. Moore, a turnip with the rootlets extensively clubbed by the action of a fungus *Plasmodiophora brassica*, and a series of *Chrysophanus phlæas*.

Mr. Edwards, specimens of many good species, *Plusia moneta*, Fab., *Phibalapteryx labidata*, Hb., *Noctua depuncta*, L., *Acidalia immorata*, L., *Dasycampa rubiginia*, Fb., being among them.

Mr. R. Adkin, bred series of *Dicranura bifida*, Hb., from Bucks., and of *D. furcula*, L., from Hants. and in remarking upon the similarity of the two species, pointed out their distinguishing features.

Mr. Fremlin, nice varied series of *Emydia cribrum*, L., from the New Forest ; and a series of *Dasycampa rubiginea*, Fb., from Berks.

Mr. C. A. Briggs, very fine varieties of *Lycæna bellargus*, Rott., from Kent ; among them were (1) an underside with the black spots much elongated, (2) an underside with most of the black spots absent, (3) and an underside with a considerable increase in size of all the white and lighter markings.

Mr. Fenn, a Shetland form of *Cidaria immanata*, Haw., and Scotch forms of *Hepialus humuli*, L., *Emmelesia albulata*, Schiff., *Pygæra pigra*, Hufn., *Hypsipetes ruberata*, Frr., and *Phibalapteryx lapidata*, Hb.

Mr. Trenerry, a light var. of *Chrysophanus phlæas*, L., from North Cornwall.

Mr. Manger, a very large *Vanessa cardui*, L., the unusually fine band contained a white spot.

Mr. Perks, a specimen of *Blatta germanica*, L.

Mr. Carrington, a number of large galls on a species of golden-rod, a quantity of freshwater shells, fruits and seeds of a wild cucumber, and a large water bug, all from British North America. He also gave an interesting account of his recent visit to Manitoba, more especially referring to the flora, its similarity to the European flora, and its autumual magnificence.

Mr. Tutt read a descriptive account of his observations of *Zygæna achilleæ*, Esp., in the Alps, illustrating his remarks by a large number of specimens taken this year.

On December 13th, Mr. William Mansbridge will read a paper on "The Lepidoptera of the Indian Territory, U.S.A., as observed by himself in 1893-4, with special reference to allied British species."

Thursday, November 22nd, E. Step, Esq., President in the chair.

Mr. Barrett exhibited on behalf of Mr. Sydney Webb, a grand series of varieties of *Arctia villica*, L., from one with very few black markings to one almost wholly suffused with black ; also on behalf of Major Still, specimens taken on Dartmoor this year, to show the apparent influence of the extreme humidity, among them being a black example of *Plusia gamma*, L., a deep-toned *Cidaria siterata*, Hufn., with a green marginal border on the hind wing, a much suffused black form of *Polyommatus phlæas*, L., and dark vars. of *Pararge megæra*, L., and *P. egeria*, *L.*

Mr. R. Adkin, on behalf of Mr. R. E. Dillon, a number of Irish Lepidoptera, including *Tæniocampa gothica*, L., var. *gothicina*, H.S., a red var. of *T. gracilis*, Fb., a dark specimen of *Aplecta nebulosa*, Hufn., and an almost black *Boarmia repandata*, L.

Mr. Tutt, a large number of Rhopalocera captured near Aix-les-Bains on August 22nd, including *Leucophasia sinapis*, L., *Colias edusa*, Fb., *C. hyale*, L., *Satyrus arethusa* W.V., and vars. *S. riseis*, L., with a very fine var. *Erebia æthiops*, Esp., and several of the genera *Argynnis*, *Lycæna*, and *Melitæa*, and read notes on them; also specimens of *Lycæna ægon*, Schiff., and *L. argus*, L., asking if anyone could point out satisfactory differentiating characters. A discussion ensued.

Mr. Fremlin, a fine specimen of *Chærocampa celeris*, L., captured at the South Foreland lighthouse on August 12th, 1894.

Mr. Mansbridge, two bred series of *Selenia bilunaria*, Esp., from Horsforth and York including a few *juliaria*, Haw. One female had only the central band developed.

Mr. Moore, *Pieris daplidice*, L., from Blois.

Mr. Tutt read a paper entitled, "*Zygæna transalpina*, Esp., and its varieties," and exhibited a large number of specimens, one being set to show the curious tufts of feather scales, said to be scent glands, which exist at the anal cavity.

Mr. Adkin read a paper entitled, "Reflections upon odd Rambles on the Sussex Downs," and exhibited a number of specimens captured near Eastbourne during his holiday there.

A discussion ensued on the various habits Rhopalocera have for effectually concealing themselves. Mr. Tutt referred to *Erebia tyndarus*, Esp., which drops down, falls over sideways, and so wriggles on the cow paths of the High Alps until it reaches some overhanging tuft of grass, under which it rests.—HY. J. TURNER, Hon. Report Secretary.

LANCASHIRE AND CHESHIRE ENTOMOLOGICAL SOCIETY.

November 12th, the President (Mr. S. J. Capper, F.L.S., F.E.S.) in the chair.

Mr. W. Hewitt, Vice-President of the York and District Field Naturalists' Society, read a paper on "*Arctia lubricipeda* and its varieties *radiata*, *fasciatu*, and *eboraci*, &c., in Yorkshire, Durham, and Lincolnshire," in which he spoke of the older specimens of *radiata* previous to 1891, and after giving a complete history of the present brood, stated that he believed this form to be genuine, and congratulated Mr. Harrison on his success. The paper was illustrated by a large number of varieties of the various forms, besides a number of specimens the result of crossing; Mr. Robson, of Hartlepool, exhibiting also a number of exotic species of the genus. Mr. Capper, Mr. Crabtree, Mr. C. F. Johnson, and others exhibited fine series of the species; Mr. G. T. Porritt's intermediate forms being much admired.

Mr. Crabtree exhibited a number of Scotch Lepidoptera, including *Sesia scoliæformis*, *Zygæna exulans*, *Crambus myellus*, &c.

Mr. Gregson, specimens of *Acidalia humiliata*, with continental specimens of *A. osseata* for comparison.

Mr. Watson exhibited *Parnassius delius* and *P. smintheus*, with microscopic preparations of their palpi and antennæ, and stated that after careful examination he had come to the conclusion that these so-called varieties were distinct species.

Mr. Hewitt had a box of varieties of *Polia chi* including the variety *olivacea*; also, two olive-brown specimens of *Bombyx quercus*, male and female, from Rhombolds Moor, Yorkshire.

Mr. Newstead, a collection of Hemiptera-Heteroptera and Homoptera, including three cases of life histories prepared by his brother, Master A. Newstead, a boy of 14, for which he had received the Kingsley prize.

Mr. Arkle, of Chester, a fine variety of *Chelonia plantaginis* bred from larvæ taken at Winchester; and a female *Erebia blandina*, from Witherslack, with five ocelli on each primary.—F. N. PIERCE, Hon. Sec.

NOTES.

ORNITHOLOGY.

Anser Egyptiacus in South Lancashire.—A pair of Egyptian Geese—gander and goose—were shot on November 24th by a local gunner, named Thomas Forster, on the River Mersey, about three miles below Warrington, not far from where Richmond Island—now washed away—stood. Both specimens are in good plumage, and have been set up by my brother, Jonas Collins, 101, Winwick Road, Warrington, who purchased them in the flesh from the man who shot them. The geese have since been identified as belonging to the above species.—Jos. Collins.

[It is very regrettable that such rare visitants should immediately fall a prey to the greed of the amateur sportsman.—Eds.]

EXCHANGE.

Duplicates.—Exotic Lepidoptera, Heliconius Rhea and Melpomene, Mechanitis leritabilis, Tinetes marcella, Catopsilia Heere. *Desiderata*: Exotic Lepidoptera and Coleoptera.—Jones, Sinclair House, by Sinclair Road, London, W.

TO CORRESPONDENTS.

Subscriptions, Exchanges, Correspondence, Notes, Papers for Publication, and all other communications must be addressed to the Editors "British Naturalist," Warrington.

All Exchanges, Queries, &c., for insertion in the following number, must reach us not later than the end of the previous month. All Queries must bear the writer's name.

Disguised Advertisements for the purpose of evading cost of advt., will not be inserted in the gratuitous exchange column. We request all Exchanges may be signed with name (or initials), and full address at the end.

Correspondents will please note and write on one side of the paper only.

Arachnida.—*The Rev. Fredk. O. Pickard-Cambridge, High Street, Swanage, will name and return any collections of British Spiders received from correspondents of the "British Naturalist," provided that several tubes be sent for their reception. He would also be glad to send types of British genera in return for any specimens he might wish to retain. The specimens* need not *be separated into tubes before sending, but a label, ready addressed and stamped, should always be enclosed. If the specimens are placed in separate numbered tubes, a paper, also numbered, should be sent for the reception of the names.*

Acarina.—*Mr. C. F. George, Belle Vue House, Kirton-in-Lindsey, will name any specimens of Acarina sent to him for that purpose.*

Diptera.—*The author of "British Flies" (Diptera). Fred. V. Theobald, M.A., F.E.S.,* 12, *Trumpington Street, Cambridge, will name specimens of Diptera sent to him for this purpose. He will also advise on the subject of injurious insects.*

Conchology.—*(Land, Freshwater.) Mr. C. O. Pickard-Cambridge, Balliol College, Oxford, will name shells sent for identification. Applicants must keep duplicates of specimens sent.*

British Odonata (Dragon Flies), and British Orthoptera.—*Mr. W. Harcourt, Bath,* 195, *Ladywood Road, Birmingham, will name specimens and answer questions referring to above orders.*

Lepidoptera.—*Mr. Eustace R. Bankes, M.A., F.E.S., The Rectory, Corfe Castle, Wareham, will name specimens of Lepidoptera sent to him for that purpose. Applicants must, however, send addressed label when requiring specimens returned.*

Mollusca: Marine and Terrestrial.—*Mr. B. Tomlin, The Green, Llandaff, will name specimens of the above Mollusca sent to him by subscribers for the purpose.*

Diptera.—*Mr. R. H. Meade, Mount Royd, Bradford, will verify and correct the names of specimens of Diptera sent to him by subscribers for that purpose.*

British Coleoptera and Hemiptera-Heteroptera.—*Mr. E. A. Newbery,* 12, *Churchill Road, Dartmouth Park, N., will name and return any specimens of the above Orders sent to him by our subscribers for that purpose. A stamped label for return should accompany each box.*

Mr. G. A. Lewcock, 16, *Allison Street, Hornsey, N., will represent "The British Naturalist" in London.*

Stamped envelope must accompany all applications.

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